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       Audi A1 2011 ➤ .
       Audi A1 Sportback 2018 ➤ ,
       Audi A2 2001 ➤ , Audi A3 1997 ➤ ,
       Audi A3 2004 ➤ , Audi A3 2013 ➤ ,
       Audi A3 2021 ➤
       Audi A3 Cabriolet 2015 ➤ ,
       Audi A3 China 2021 ➤
       Audi A3 Limousine 2014 ➤
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       Audi A5 2016 ➤ .
       Audi A5 Cabriolet 2009 ➤ .
       Audi A5 Coupé 2008 ➤ .
       Audi A5 Sportback 2010 ➤
       Audi A6 1995 ➤ , Audi A6 1998 ➤ ,
       Audi A6 2005 ➤ , Audi A6 2011 ➤
       Audi A6 2019 ➤ , Audi A6 China 2012 ➤ ,
       Audi A6 China 2019 ➤
       Audi A7 Sportback 2011 ➤,
       Audi A7 Sportback 2018 ➤ ,
       Audi A8 1994 ➤ , Audi A8 2003 ➤ ,
       Audi A8 2010 ➤ , Audi A8 2018 ➤ ,
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Audi Q2 China 2019 >, Audi Q3 2012 >,
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Audi Q3 China 2019 >,
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Audi Q5 China 2019 >, Audi Q7 2007 >,
Audi Q7 2016 >, Audi Q8 2018 >,
Audi Q8 e-tron 2024 >, Audi R8 2007 >,
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Edition 12.2022

Refrigerant R134a Servicing

List of Workshop Manual Repair Groups

Repair Group

87 - Air Conditioning



Technical information should always to be inavailable of the instructions is liability essential to ensure vehicle road-worthiness and safety. In addition, the normal as basic safety precautions for working on motor vehicles must, as a matter of course, be observed.



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Air Conditioning

Safety Precautions

(Edition 12.2022)

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- ⇒ "1.1 Safety Precautions when Working on A/C Systems", page 1
- ⇒ "1.2 Safety Precautions when Handling Refrigerant", page
- 1 Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not
- permitted unless authorised by AUDI AG. AUDI AG does not quarantee or accept any liability *1.3 Safety Precautions when Working on Vehicles with Start/ Stop System", page 2
- ⇒ "1.4 Safety Precautions when Working on Vehicles with High-Voltage System", page 2
- ⇒ "1.5 Safety Precautions when Working near High-Voltage Components", page 3
- ⇒ "1.6 Safety Precautions during Road Test with Testing Equipment", page 4

1.1 Safety Precautions when Working on A/C Systems

Ignition sources are extremely dangerous and pose a risk of explosion

There is a risk of fatal injury and explosions due to ignition sources near the A/C system and refrigerant cylinders. Leaking refrigerant can ignite and cause an explosion. There is a risk of fatal or serious bodily injury due to an explosion.

- Never bring ignition sources near A/C systems and refrigerant cylinders.
- Discharge electrostatic and prevent sparks resulting from striking tools and hot surfaces.

There is risk of destroying the refrigerant lines.

The refrigerant lines can be destroyed by ripping through the inner foil.

Never bend the refrigerant lines to a radius smaller than r = 100 mm.

1.2 Safety Precautions when Handling Refrigerant

There is a risk of asphyxiation and poisoning from refrigerant.

Refrigerant fumes can cause problems ranging from a dry cough and nausea to asphyxiation and poisoning.

- Never inhale refrigerant fumes.
- Only work on the refrigerant circuit in well-ventilated areas and protect refrigerant cylinders.

- Αυδι
- Never work near basement staircases or other low-lying areas.
- Switch on exhaust extraction.

There is a risk of getting frostbite from the refrigerant.

When working on the A/C system, refrigerant under pressure can escape. Frostbite on the skin and other parts of the body is possible.

- Wear safety gloves.
- Wear protective eyewear.
- Evacuate or drain refrigerant and open the refrigerant circuit immediately.
- If more than 10 minutes elapse after extracting or draining the refrigerant and the refrigerant circuit has not been by copyright. Copying for private or commercial purposes, in part or in whole, is not opened, extract or drain the refrigerant again. Pressure depless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG. velops in the refrigerant circuit due to evaporation.

1.3 Safety Precautions when Working on Vehicles with Start/Stop System

There is a risk of injury due to the engine starting unexpectedly.

The engine may start unexpectedly in vehicles with the Start/ Stop System activated. A message in the instrument cluster indicates whether the Start/Stop System is activated.

Deactivate the Start/Stop System: switch off the ignition.

1.4 Safety Precautions when Working on Vehicles with High-Voltage System

High voltage increases the risk of fatal injury

The high-voltage system is under high voltage. Electrocution by direct contact or electric arc can cause severe bodily injury or fatal injury.

- When working on the high-voltage system, the high-voltage system must be de-energized.
- In some cases the high-voltage system must also be deenergized when the work procedures do not directly affect the high-voltage system.
- Note the work procedures that require the system to be deenergized. Refer to ⇒ Rep. Gr. 00; High-Voltage System Danger Classification .
- Have an Audi high-voltage technician (HVT) or an Audi highvoltage expert (HVE) de-energize the high-voltage system.



There is a risk of injury due to the engine starting unexpectedly.

Active drive ready mode is difficult to identify in electric and hybrid vehicles. Parts of the body can be pinched or pulled in.

- Switch off the ignition.
- Place the ignition key outside of the vehicle interior.

There is a risk of injury due to an activated parking heater and

The parking heater and A/C can switch on unintentionally on electric and hybrid vehicles with an activated parking heater pyright. Copying for private or commercial purposes, in part or in whole, is not and A/C. Body parts can be pinched or pulled in if the iradiator authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG. fan starts running by itself.

Deactivate the parking heater and A/C.



1.5 Safety Precautions when Working near High-Voltage Components

High voltage increases the risk of fatal injury

The high-voltage system is under high voltage. Electrocution by direct contact or electric arc can cause fatal or serious bodily injury if high-voltage components and high-voltage cables are damaged.

- Visually inspect the high-voltage components and the highvoltage cables.
- Never use cutting, shaping, or sharp-edged tools near highvoltage components and high-voltage cables.
- Never weld, solder, or use thermal bonding or hot air near high-voltage components and high-voltage cables.

There is a risk of damaging the high-voltage cables.

Incorrect handling can damage the insulation on high-voltage cables or high-voltage connectors.

- Never use the high-voltage cables and the high-voltage connectors for support.
- Never support tools on the high-voltage cables and the highvoltage connectors.
- Never sharply bend or kink the high-voltage cables.
- Pay attention to the coding when connecting the high-voltage connectors.

ιδυΑ

Safety Precautions during Road Test with Testing Equipment 1.6

There is a risk of injury due to unsecured testing equipment.

If the front passenger airbag activates during a collision, unsecured testing equipment becomes a dangerous projectile.

Secure testing equipment on the rear seat.

or

Have a second person operate testing equipment on the rear seat.





2 A/C System, General Information

- ⇒ "2.1 Introduction", page 5
- ⇒ "2.2 Additional Information Sources", page 5
- ⇒ "2.3 A/C Technology Basic Principles", page 6
- ⇒ "2.4 Refrigerant R134a", page 9
- ⇒ "2.5 Refrigerant R134a Properties", page 10
- ⇒ "2.6 Refrigerant Oil", page 12
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- ⇒ "2.10 Refrigerant, Handling", page 15
- ⇒ "2.11 Pressure Reservoirs, Handling", page 16
- ⇒ "2.12 Refrigerant Circuit General Precautions", page 17
- ⇒ "2.13 After Charging A/C System and Before Activating A/C System", page 20

2.1 Introduction

The purpose of this repair manual is to provide service advisors and technicians with the basic knowledge needed to ensure professional and competent procedures. In part of the wholes authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



Note

Only the careful study of this documentation, practical implementation of the information contained, training on A/C systems and expert knowledge (with or without certificate) can guarantee expertise in the field of motor vehicle A/C systems.

This document is a compact reference work which should be kept at the workplace. It should also be available to the current supervising authority upon request.

2.2 Additional Information Sources

- Repair manual for model-specific repair work. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 Component Location Overview - A/C System (vehicle-specific repair manual) and ⇒ Wiring diagrams, Troubleshooting & Component locations.
- Technical Service Handbook outlining actions to be taken to rectify current problems
- Self-Study Program, for example, ⇒ Self Study Program No. 208; Vehicle A/C Systems
- Video programs for in-dealership training
- Special tools and workshop equipment needed to service the A/C system. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).
- Service Organization Volume "1" "Additional Equipment" ⇒ Audi ServiceNet, Handbooks

A/C System with Refrigerant R12 repair manuals (only hardcopies of this manual are available for vehicles through MY

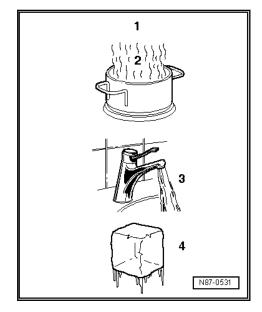
2.3 A/C Technology Basic Principles

- ⇒ "2.3.1 Physical Principles", page 6
- ⇒ "2.3.2 Pressure and Boiling Point", page 6
- ⇒ "2.3.3 Refrigerant R134a Vapor Pressure Table", page 7

2.3.1 Physical Principles

The four known states of water also apply to A/C system refrigerants.

- Gaseous (invisible)
- 2 -Vapor
- 3 -Liquid
- Solid



When water is heated in a container (heat absorption), rising water vapor becomes visible. If the vapor continues to heat up through heat absorption, the visible vapor turns into invisible gas. The process is reversible. If heat is extracted from water in gaseous form -A-, it changes first to vapor -B-, then to water and finally to ice.

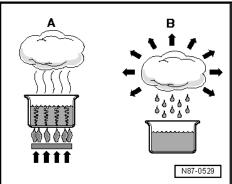
- A Heat Absorption
- B Heat Emission

Heat Always Transfers from Warm to Cold Matter

All matter consists of a mass of moving molecules. The fast moving molecules of a warmer substance give off some of their energy to the cooler and thus slower molecules. As a result, the molecular motion of the warmer substance slows down and that of the colder substance is accelerated. This process continues until the molecules of both substances are moving at the same rooses, in part or in whole, is not speed. They are then at the same temperature and no mores not guarantee or accept any liability heat transfer occurs. rrectness of information in this document. Copyright by AUDI AG



The boiling point given in tables for a liquid is always referenced to an atmospheric pressure of 1 bar (14.5 psi). If the pressure acting on a fluid changes, its boiling point also changes.



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Note

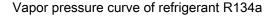
Pressure is measured in different units: 1 MPa (mega Pascal) corresponds to 10 bar (145.04 psi) positive pressure or 145 psi. 1 bar (14.5 psi) absolute pressure corresponds to 0 bar (0 psi) positive pressure and thus to the ambient pressure (atmospheric pressure).

It is known that, for example, water boils at a lower temperature when the pressure is lower.

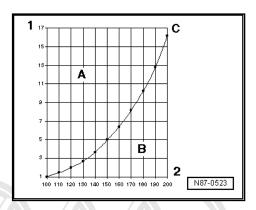
The vapor pressure curves for water and refrigerant R134a show that, at constant pressure, reducing the temperature changes vapor to liquid (in the condenser) or that reducing the pressure causes the refrigerant to change from liquid to vapor (inside the evaporator).

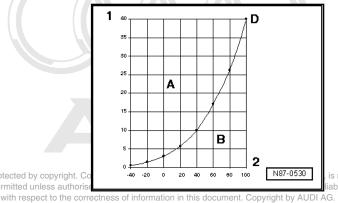
Vapor pressure curve of water

- A Liquid
- B Gaseous
- C Vapor pressure curve of water
- 1 Pressure acting on liquid in bar (absolute)
- 2 Temperature in °C



- A Liquid
- B Gaseous
- D Vapor pressure curve of refrigerant R134a
- 1 Pressure acting on liquid in bar (absolute)
- 2 Temperature in °C





2.3.3 Refrigerant R134a Vapor Pressure Table

The vapor pressure tables for every refrigerant is published in the literature for the refrigeration system technicians. This table makes it possible to determine the vapor pressure acting on the column of liquid in a reservoir if the temperature of the reservoir is known.

Since each refrigerant has its own specific vapor pressure table, refrigerant can be identified by measuring the pressure and temperature.



Note

- At absolute pressure, "0 bar (0 psi)" corresponds to absolute vacuum. Normal ambient pressure (positive pressure) equals approximately "1 bar (14.5 psi)" absolute pressure. "0 bar (0 psi)" pressure corresponds to an absolute pressure of one bar (0 psi)" balow "0") (-14.5 psi)" below "O").
- Pressure is measured in different units: 1 MPa (mega Pascal) corresponds to 10 bar (145.04 psi) positive pressure all purposes, in part or in whole, is not or 145 psi. 1 bar (14.5 psi) absolute pressure corresponds not guarantee or accept any liability to 0 bar (0 psi) positive pressure and thus to the ambient ocument. Copyright by AUDI AG. pressure (atmospheric pressure).

Temperature in °C (°F)	Pressure in bar (psi) of R134a
-45 (-49)	-0.61 (-8.85)
-40 (-40)	-0.49 (-7.11)
-35 (-31)	-0.34 (-4.93)
-30 (-22)	-0.16 (-2.32)
-25 (-13)	0.06 (0.87)
-20 (-4)	0.32 (4.64)
-15 (-5)	0.63 (9.14)
-10 (14)	1.00 (14.50)
-5 (23)	1.43 (20.74)
0 (32)	1.92 (27.85)
5 (41)	2.49 (36.11)
10 (50)	3.13 (45.40)
15 (59)	3.90 (56.57)
20 (68)	4.70 (68.17)
25 (77)	5.63 (81.66)
30 (86)	6.70 (97.18)
35 (95)	7.83 (113.57)
40 (104)	9.10 (131.98)
45 (113)	10.54 (152.87)
50 (122)	12.11 (175.64)
55 (131)	13.83 (200.59)
60 (140)	15.72 (228.00)
65 (149)	17.79 (258.02)
70 (158)	20.05 (290.80)
75 (167)	22.52 (326.63)
80 (176)	25.21 (362.59)
85 (185)	28.14 (408.14)
90 (194)	31.34 (454.55)

2.4 Refrigerant R134a

- ⇒ "2.4.1 Refrigerant R134a Physical Data", page 9
- ⇒ "2.4.2 Critical Point", page 9
- <u>2.4.3 Refrigerant R134a Environmental Information", page</u>

A/C systems in vehicles utilize the vaporization and condensation process. Thus one must work with a substance that boils easily, which is described here as refrigerant.

The refrigerant used is tetrafluoroethane R134a, which boils at -26.5 °C (-15.7 °F) at a vapor pressure of "1 bar (14.5 psi)" (absolute pressure corresponds approximately to the ambient pressure).

2.4.1 Refrigerant R134a Physical Data

Chemical formula	CH2F-CF3 or CF3-CH2F	
Chemical designation	Tetrafluorethane	
Boiling point at 1 bar (14.5 psi)	-26.5 °C (-15.7 °F)	
Solidification point	-101.6 °C (-150.9 °F)	
Critical temperature	100.6 °C (213.1 °F)	
Critical pressure	40.56 bar (588.27 psi) (absolute)	

2.4.2 Critical Point

The critical point (critical temperature and critical pressure) means the substance has gone above the point when there is no longer a boundary between liquid and gas.

A substance above its critical point is always in the gaseous state.

Protect At temperatures below the critical point, all types of refrigerant in pressure reservoirs exhibit both a liquid and a gas phase, meaning there is a layer of gas above the liquid.

As long as both liquid and gas are present in the reservoir, the pressure is dependent on the ambient temperature. Refer to Refer to ⇒ "2.3.3 Refrigerant R134a Vapor Pressure Table", page 7 "Vapor Pressure Table".



Note

Different types of refrigerant are never to be mixed. Only the refrigerant designated for the corresponding A/C system may be used.

2.4.3 Refrigerant R134a Environmental Information

- R134a is a fluorocarbon and contains no chlorine.
- R134a has a shorter atmospheric life span than refrigerant R12.
- R134a does not damage the ozone layer. The ozone depletion potential is zero.
- The global warming potential of R134a (Global Warming Potential = GWP) is approximately 1400 (the GWP of carbon dioxide = 1). To reduce the influence of the greenhouse effect of refrigerant R134a, the European commission has made it mandatory that no vehicles from 01/01/2017 with

refrigerant in the vehicle A/C system with a GWP greater than 150 may be introduced to the market. A/C systems in vehicles that were introduced to the market up to 12/31/2016 can be filled and driven with refrigerant R134a until further

The global warming effect of R134a is "10" times less than that of refrigerant R12.

2.5 Refrigerant R134a Properties

- ⇒ "2.5.1 Commercial Names and Designations", page 10
- ⇒ "2.5.2 Color", page 10
- ⇒ "2.5.3 Vapor Pressure", page 10
- ⇒ "2.5.4 R134a Physical Properties", page 11
- ⇒ "2.5.5 Affect on Metal", page 11
- ⇒ "2.5.6 Critical Temperature/Pressure", page 11
- ⇒ "2.5.7 Water Content", page 11
- ⇒ "2.5.8 Combustibility", page 11
- ⇒ "2.5.9 Charge Factor", page 11
- ⇒ "2.5.10 Evidence of Leaks", page 12

2.5.1 Commercial Names and Designations

Refrigerant R134a is currently available under the following brand names:

- H-FKW 134a
- SUVA 134a
- KLEA 134a



Note

- Different brand names may be used in other countries.
- Of the wide range of refrigerants available, only this refrigerant may be used in motor vehicles. The designations Frigen and Freon are brand names. They also apply to refrigerants which are not allowed be used in motor vehicles.

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Like water, refrigerants-are colorless in both wapor and fiquid pyright by AUDI AG. form. Gas is invisible. Only the boundary layer between gas and liquid is visible. (Liquid level in charging cylinder tube or bubbles in sight glass). Refrigerant R134a fluid may appear colored (milky) in a sight glass. This cloudiness is caused by partially dissolved refrigerant oil and does not indicate a malfunction.

2.5.3 Vapor Pressure

In a partially filled, closed reservoir, the quantity of refrigerant evaporating from the surface equals the quantity returning to the liquid state as vapor particles condense. This state of equilibrium occurs under pressure and is often called vapor pressure. The vapor pressure depends on the temperature. Refer to Refer to ⇒ "2.3.3 Refrigerant R134a Vapor Pressure Table", page 7 "Vapor Pressure Table".



2.5.4 R134a Physical Properties

The vapor pressure curves of R134a and other refrigerants are sometimes very similar, therefore it is not possible to make a certain distinction solely based on pressure.

With R134a, the A/C compressor is lubricated with special synthetic refrigerant oils, for example, PAG oils (polyalkylene glycol oils).

2.5.5 Affect on Metal

In its pure state, refrigerant R134a is chemically stable and does not corrode iron or aluminum.

Contaminants, such as chlorine compounds, in the refrigerant however cause corrosion of certain metals and plastics. This can lead to blockage, leaks or deposits on the A/C compressor piston.

2.5.6 Critical Temperature/Pressure

The refrigerant R134a remains chemically stable up to a gas pressure of 39.5 bar (572.9 psi) (absolute pressure of 40.56 bar (588.27 psi), which corresponds to a temperature of 101 °C (213.8 °F)). Above this temperature, the refrigerant breaks down (refer to "Combustibility").

2.5.7 Water Content

Only very small amounts of water are soluble in liquid refrigerant. On the other hand, refrigerant vapor and water vapor mix in any ratio.

Any water in the refrigerant circuit will be entrained in the form of droplets once the dryer in the fluid or collecting container has absorbed approximately 7 grams of water. This water flows up to the expansion valve nozzle or restrictor and turns to ice, and the A/C system no longer has a cooling effect.

Water destroys the A/C system because it forms acids when the combined with other contaminants at high pressures and temperatures.

2.5.8 Combustibility

Refrigerant is non-flammable. It actually has a fire-resistant or fire extinguishing effect. Refrigerant breaks down when exposed to flames or extremely hot surfaces. UV light (occurring for example during electric welding) also causes refrigerant decomposition. The resulting decomposition products are toxic and must not be inhaled. However, irritation of the mucous membranes provides an adequate and timely warning.

2.5.9 Charge Factor

A cylinder must have space for vapor as well as liquid. As the temperature rises, the liquid expands. The space filled with vapor decreases. At a certain point, there will only be liquid in the cylinder. Beyond this, even a slight increase in temperature causes a large amount of pressure to build up in the cylinder as the liquid attempts to continue expanding despite the absence of the necessary space. The forces that result are strong enough to rupture the cylinder. To prevent a cylinder from being overfilled, the regulations regarding compressed gases specify how many kilograms of refrigerant may be added to a cylinder per liter of internal volume. The product of multiplying this charge factor by the internal volume of the cylinder is the permissible capacity. The figure for refrigerant used in vehicles is 1.15 kg (2.54 lbs) / liter.

2.5.10 Evidence of Leaks

External damage, for example, can cause a leak in the refrigerant circuit. The small quantity of refrigerant escaping from minor leaks can be detected, for example, by using an electronic leak detector or by introducing a UV-leak detection additive into the refrigerant circuit. Electronic leak detectors can recognize leaks with refrigerant losses of less than 5 grams per year.



Note

Use leak detectors designed for the type of refrigerant. For example, a leak detector for refrigerant R12 will not work with R134a because R134a refrigerant has no chlorine atoms so the leak detector will not respond to it.

2.6 Refrigerant Oil

⇒ "2.6.1 Refrigerant Oil Properties", page 13



Caution

When handling refrigerant oil, pay attention to local regulations. Refer to ⇒ Audi ServiceNet, HSO Environmental Protection (or ⇒ Volkswagen ServiceNet, Handbooks, Service Handbook; Environmental Protection).

Refrigerant oil mixes with the refrigerant (approximately 20-40%, depending on compressor type and amount of refrigerant), circulates continuously in the circuit and lubricates the moving parts.

Special synthetic refrigerant oils, for example polyalkylene glycol (PAG) oil, are used in conjunction with R134a A/C systems. This is necessary as mineral oil, for example, does not mix with R134a. In addition, the materials of the R134a A/C system could be affected if the mixture flows through the refrigerant circuit under pressure at high temperatures or the lubricating film in the A/C compressor tears. Using non-approved oils can cause the A/C system to malfunction. Only use approved oils.

Refer to the ⇒ Electronic Parts Catalog (ETKA).

Type of oil for R134a in motor vehicles: PAG. (Polyalkylene rotected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability glycol) with respect to the correctness of information in this document. Copyright by AUDI AG.



Note

- Do not store open containers of refrigerant oil because it attracts moisture.
- Always keep oil containers sealed.
- Do not use used refrigerant oil. Used oil of an unknown origin must be disposed of according to local regulations. Refer to ⇒ Audi ServiceNet, HSO Environmental Protection (or ⇒ Volkswagen ServiceNet, Handbooks, Service Handbook; Environmental Protection).
- Ester-based oils are only intended for use in large systems at this time, not in motor vehicle A/C systems.



Refer to ⇒ "2.6.1 Refrigerant Oil Properties", page 13

2.6.1 Refrigerant Oil Properties

The most important properties are the high degree of solubility with refrigerant, good lubrication, no acid content and very minimal water content. For this reason only very specific oils are permitted. Refer to Refer to ⇒ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities", page 360 for a list of approved refrigerant oils and capacities.

PAG oils, which are appropriate for refrigerant R134a, are highly hygroscopic and do not mix with other oils. Opened containers should therefore be closed again immediately to prevent ingress of moisture. Moisture and acids promote aging of refrigerant oil, causing it to become dark and viscous as well as corrosive towards metals.



Note

- Refrigerant oil, because of its chemical properties, must not be disposed of with engine oils or transmission oils. Refrigerant oil is to be disposed of as used oil of unknown origin (pay attention to local regulations). Refer to ⇒ Audi ŠerviceNet, HSO Environmental Protection (or ⇒ Volkswagen ServiceNet, Handbooks, Service Handbook; Environmental Protection).
- Only the oil approved for the A/C compressor may be used in refrigerant circuits with refrigerant R134a. Refer to the ⇒ Electronic Parts Catalog (ETKA) and Refer to ⇒ and Refrigerant Oil Capaci-<u>"10.2 Approved Refrigerant Oi</u> ties", page 360 for the capacities.

Important information:

Refrigerant oil attracts moisture. Close any opened containers immediately after use to prevent moisture from entering.

2.7 A/C System Operation

⇒ "2.7.1 Comfort", page 14

⇒ "2.7.2 Environmental Information", page 14

The temperature in the passenger compartment depends on the amount of heat radiated through the windows and conducted by the metal parts of the body. In hot weather it is possible to achieve a more comfortable temperature for the passengers by drawing off some of the heat.

As heat spreads into cooler areas, the passenger compartment is equipped with a unit for generating low temperatures. In the unit, refrigerant is constantly being evaporated. The heat required for this is extracted from the air flowing through the evaporator.

After absorbing the heat, the refrigerant is pumped through the A/C compressor. The compression action of the A/C compressor increases the heat content and temperature of the refrigerant. Its temperature is then substantially higher than that of the surrounding air.

The hot refrigerant flows to the condenser. There, the refrigerant releases its heat through the condenser to the surrounding air due to the temperature difference between the refrigerant and the air.

The refrigerant thus acts as a heat transfer medium. Since it is to be reused, the refrigerant returns to the evaporator.



For this reason, all A/C systems are based on the refrigerant circulation principle. However there are differences in the makeup of the assemblies.

Refer to <u>⇒ "2.7.1 Comfort"</u>, page 14

Refer to ⇒ "2.7.2 Environmental Information", page 14

2.7.1 Comfort

Being comfortable while driving leads to better concentration and safe driving. An A/C system makes drivers and passengers more comfortable especially when temperatures or humidity are high. While opening the windows or sunroof or increasing the air flow can make vehicle occupants more comfortable, it also exposes them to more noise, drafts, exhaust, pollen and dust.

Climate control together with a good heating and ventilation system concept can create a sense of well-being and comfort by regulating temperature, humidity and air circulation in the vehicle interior to suit ambient conditions. This is done both when the vehicle is moving and when it is stationary.

The A/C system also offers these advantages:

- It cleans the air that enters the vehicle interior (dust and pollen, for example, are washed out by the moist fins of the evaporator and removed with the condensation water).
- Temperatures in a mid-size vehicle (for example: after a short drive, outside temperature 30 °C (86 °F) in the shade and the vehicle exposed to sunlight).

	With A/C system	Without A/C system
Head area	23 °C (73.4 °F)	42 °C (107.6 °F)
Upper body area	24 °C ₀ (75,2y°F ₀)yrigh	t. Co 4,0 1g° C ((1.04 o° E) mme1
Footwell area	30 Cw(86 spE) to the	corrections of the correction

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2.7.2 **Environmental Information**

Since approximately 1992, the A/C systems in newly manufactured cars have been successively converted to refrigerant R134a. This refrigerant does not contain chlorine and does not deplete the ozone layer.

Until approximately 1992, refrigerant R12 was used for A/C systems. Due to its chlorine atoms, this CFC has a high potential for depleting the ozone layer as well as a tendency to increase the greenhouse effect.

Conversion programs are available for old existing systems filled with the ozone-depleting substance R12. Refer to ⇒ Repair Manual for A/C Systems with Refrigerant R12 (this repair manual is only available in hard copy).

The global warming potential of R134a (Global Warming Potential = GWP) is approximately 1400. For this reason the European commission has made it mandatory that from 01/01/2017 no new vehicles with this refrigerant can be brought onto the market. Refer to Refer to ⇒ "2.4.3 Refrigerant R134a Environmental Information", page 9. Therefore, a refrigerant with a GWP less than 150 is introduced for new vehicles from MY 2016 (for example, refrigerant R1234yf with a GWP less than 5).

For environmental protection reasons, refrigerants must not be released into the atmosphere. Refer to Refer to ⇒ "4 Laws and Regulations", page 67 for laws and regulations.



2.8 **General Safety Precautions**

- As per VBG 20, German industrial liability insurance association.
- Pay attention to the workshop-specific instructions. Refer to ⇒ Audi ServiceNet, HSO Environmental Protection . This should be kept in the workshop.

Product Characteristics 2.9

Refrigerants used in motor vehicle air conditioning systems belong to the new generation of refrigerants based on chlorinefree, partially fluorinated hydrocarbons (H-FKW, R134a).

With regard to their physical properties, these are refrigerants which have been liquefied under pressure. They are subject to pressure canister regulations and only approved and appropriately-marked compressed-gas canisters may be used.

Compliance with specific conditions is required to ensure safe and proper use.

Refrigerant, Handling 2.10

If refrigerant canisters are opened, the contents may escape in liquid or vapor form. This intensifies the higher the pressure in the canister.

The pressure level is dependent on two factors:

- The type of refrigerant in the canister. "Reason: the lower the boiling point, the higher the pressure.
- The temperature level. "Reason: the higher the temperature, the higher the pressure."



WARNING

- There is a risk of freezing.
- The refrigerant can then escape as a fluid or vapor.
- Do not open canisters that contain refrigerant.

Wear protective eyewear.

Put on protective eyewear. They prevent refrigerant getting into the eyes, as this could cause severe injury from exposure to cold.

Safety Gloves and Apron

Greases and oils dissolve readily in refrigerants. They would therefore destroy the protective layer of grease if allowed to come into contact with the skin. Degreased skin is however sensitive to the cold and germs.

Fluid Refrigerant - Avoiding Contact with Skin nercial purposes, in part or in whole, is not

The refrigerant draws heat for evaporation from the surrounding, AUDI AG. area. Even if this is the skin. This may cause extremely low temperatures. Frost bite may result at the point of contact (boiling point of R134a: -26.5 °C (-15.7 °F) at ambient pressure).

Do not breathe in the refrigerant vapors

If highly concentrated refrigerant vapor escapes, it mixes with the surrounding air and displaces the oxygen necessary for breathing.

No Smoking Rule

A burning cigarette can cause refrigerant to decompose. The resulting substances are toxic and must not be inhaled.

Welding and Soldering on Refrigeration Systems

Before performing welding or soldering work on vehicles near A/C system components, extract the refrigerant and remove remnants by blowing them out with nitrogen.

The products of refrigerant decomposition due to the effect of heat are not only toxic, but may also have a highly corrosive effect on pipes and system components. They mainly take the form of hydrogen fluoride.

Pungent odor

A pungent odor indicates that the products of decomposition mentioned above have already formed. Avoid inhaling these substances under all circumstances, as otherwise the respiratory system, lungs and other organs could be damaged.

First Aid

- If contact with eyes or mucous membranes occurs, immediately rinse with copious amounts of running water and consult an eye specialist.
- If contact with the skin occurs, immediately remove affected clothing and rinse skin with copious amounts of water.
- If inhalation of highly concentrated refrigerant vapors occurs, immediately take the affected person(s) into the fresh air. Call a doctor. Administer oxygen in the eventy of preathing for private or commercial purposes, in part or in whole, is not difficulties. If the affected person has difficulty ibreathing or AUDI AG. AUDI AG does not guarantee or accept any liability cannot breathe, tip head back and perform mouth to mouth of information in this document. Copyright by AUDI AG. respiration.

Refer to ⇒ "2.11 Pressure Reservoirs, Handling", page 16

2.11 Pressure Reservoirs, Handling

Secure cylinders to prevent them from falling over.

Secure upright cylinders to stop them falling over and secure cylinders lying flat to stop them rolling away.

Do not throw the cylinders.

If dropped, the reservoir could be so severely deformed that it ruptures. The refrigerant evaporates immediately, releasing considerable force. Flying fragments of cylinders can cause severe injuries.

To protect the valves, cylinders must only be transported with the cap screwed on.

Valves may break off if cylinders are not properly transported.

Never store near heating devices.

High temperatures may occur next to heating devices. High temperatures are also accompanied by high pressures and the maximum permissible cylinder pressure may be exceeded.

No Warming above 50 °C (122 °F)

To reduce risk, pressure canister regulations specify that canisters must not be heated above 50°C (122 °F).

No Unmonitored Warming

Do not heat using an open flame under any circumstances. Localized overheating can cause structural changes in the container material, which then reduces its ability to withstand pressure. There is also a danger of refrigerant decomposition due to localized overheating.

Empty Cylinders, Sealing

Empty refrigerant cylinders must always be sealed to prevent moisture from entering. Moisture causes steel cylinders to corrode. This weakens the cylinder walls. In addition to this, rust particles that enter refrigeration systems from containers will cause malfunctions.

2.12 Refrigerant Circuit General Precautions

- ⇒ "2.12.1 General Information", page 17
- ⇒ "2.12.2 Refrigerant Circuit, Cleaning", page 17
- ⇒ "2.12.3 Additional Information for Vehicles with A/C Compressor without A/C Clutch, (only with A/C Compressor Regulator <u>Valve N280)", page 18</u>
- ⇒ "2.12.4 Additional Information for Vehicles with High-Voltage System", page 18
- ⇒ "2.12.5 O-Rings", page 19

2.12.1 **General Information**

- Workshop-specific instructions. Refer to ⇒ Audi ServiceNet, HSO Environmental Protection.
- Ensure absolute cleanliness when working
- Wear protective eyewear and safety gloves when working with refrigerant and nitrogen.

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- Workshop ventilation systems must be switched on AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Converted by AUDI AG.
- Only use the A/C service station to discharge the refrigerant circuit, and then open the threaded connections and replace any faulty components.
- Use a cap to seal off any opened assemblies and hoses to prevent moisture and dirt from getting in.
- Only use tools and materials designated for refrigerant R134a.
- Seal opened refrigerant oil containers to guard against moisture.



Note

- After completing repair work, install closure caps (with seals) on all connections with valve and service connections.
- Before operating the A/C system. Observe vehicle specific filling capacities. Refer to Refer to ⇒ "10 Refrigerant R134a" Capacities, Refrigerant Oil and Approved Refrigerant Oils", page 318 .
- Do not add refrigerant, extract the refrigerant present and refill the system.

2.12.2 Refrigerant Circuit, Cleaning

Clean the refrigerant circuit with refrigerant R134a (flush with refrigerant R134a) (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow out with compressed air and nitrogen (refer to Refer to



"5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89) if:

- Moisture or dirt has gotten into the refrigerant circuit (after a collision for example).
- Refrigerant oil is dark and viscous.
- There is too much refrigerant oil in the refrigerant circuit after replacing the compressor.
- The A/C compressor had to be replaced due to "internal" damage (for example, noises or no output).



Note

When cleaning components with compressed air and nitrogen, always extract the gas mixture escaping from the components through a suitable exhaust extracting system (workshop extraction system).

2.12.3 Additional Information for Vehicles with A/C Compressor without A/C Clutch, (only with A/C Compressor Regulator Valve - N280-)

- The engine can be started only after the refrigerant circuit has been completely assembled (the A/C compressor runs continuously).
- If the engine has to be run when the refrigerant circuit is empty, only do so for as long as absolutely necessary and avoid high engine speeds.

Additional Information for Vehicles with 2.12.4 High-Voltage System

Vehicles with a high-voltage system (hybrid vehicles)

- For additional information about the high-voltage system, refer to ⇒ Rep. Gr. 00; Safety Precautions or ⇒ Electrical Equipment; Rep. Gr. 93; General Warnings for Working on High-Voltage System .
- If procedures on high-voltage system components are required, de-energize the high-voltage system. Refer to ⇒ Rep. Gr. 00; Safety Precautions or ⇒ Electrical Equipment; Rep. Gr. 93; General Warnings for Working on High-Voltage System:
- The engine may only be started if the refrigerant circuit is or in whole, is not complete(y) tasseemble brised by AUDI AG. AUDI AG does not guarantee or accept any lial with respect to the correctness of information in this document. Copyright by AUDI AG.
- Hybrid drive on vehicles with battery cooling is only possible with a charged A/C system in which there are no stored errors. Refer to ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for the A/C system and the Battery Regulation .
- After the installing the electrically-driven A/C compressor and the subsequent charging the refrigerant circuit, first start the A/C compressor using the "compressor cut-in" function of the basic setting. If refrigerant oil has accumulated in the A/C compressor compression chamber before installation due to improper storage, this could cause damage to the A/C compressor. Refer to ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for A/C System and Battery Regulator



- Only activate the electrically-driven A/C compressor when the refrigerant circuit is filled. The A/C compressor may become damaged if the A/C compressor is run when the refrigerant circuit is empty. Refer to ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for A/C System and Battery Regulation .
- So that the refrigerant circuit can be discharged, evacuated and charged, different electrically-controlled valves must be opened depending on the design of the refrigerant circuit (for example on the Audi Q7 e-tron). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit and use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.
- To check the A/C system function, certain electrically-controlled valves must be opened or closed (for example on the Audi Q7 e-tron). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit and use the > Vehicle diagnostic tester in the "Guided Fault Finding" function.
- Depending on the vehicle, there is not actually high pressure present at the high pressure side service connection during every A/C system operating condition (for example, on the Audi Q7 e-tron). Therefore the sensors installed in the refrigerant circuit must be used to check the A/C system function in these vehicles. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit .
- Charge the vehicle batteries, for example, using the Battery Charger - VAS 5904- in the battery support mode to minimize the number of automatic starts during the test- and measuring procedures while the ready mode is active. Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 27; Battery, Charging and ⇒ Electrical Equipment; Rep. Gr. 93; General Warnings for Working on High-Voltage System.
- For testing and measurement procedures that require the ready mode to be active or the ignition to be switched on, the selector lever must be in the "P" position and the parking brake must be activated. The required tools must be placed so that they do not come into contact with any rotating components in the engine and they must also not go into the vicinity of the rotating components when the engine is running.

2.12.5 O-Rings

- Only use seals that are resistant to refrigerant, R134a and ing for private or commercial purposes, in part or in whole, is not the related refrigerant oils. Color coding of ⊕rings is noed by AUDI AG. AUDI AG does not guarantee or accept any liability longer offered. Colored and black O-rings are used he correctness of information in this document. Copyright by AUDI AG.
- Be sure to use seals with the correct inner diameter. Refer to ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- The seals may be used only one time.
- Coat the seals lightly with refrigerant oil (PAG oil) before installing.

2.13 After Charging A/C System and Before Activating A/C System

Mechanically Driven A/C Compressor

After attaching the A/C compressor to the engine (before positioning the belt or installing the input shaft). Refer to Refer to ⇒ "5.3.6 A/C System, Operating after Charging", page 86 and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor.

 Turn the A/C compressor approximately 10 turns by hand via the clutch plate or belt pulley on the A/C clutch.

After charging. Refer to ⇒ "5.3.6 A/C System, Operating after Charging", page 86.

- Start the engine with the A/C system turned off (A/C Clutch N25- and A/C Compressor Regulator Valve N280- are not actuated).
- After the engine idle speed stabilizes, switch on the A/C compressor and operate for at least 10 minutes at idle speed with maximum cooling output.

Electrically-Driven A/C Compressor

First start the electrically-driven A/C compressor after charging the refrigerant circuit via the "compressor cut-in" function of the basic setting. Refer to ⇒ "5.3.6 A/C System, Operating after Charging", page 86 and ⇒ Vehicle Diagnostic Tester in "Guided Fault Finding" Function for A/C System and Battery Regulation.



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3 Refrigerant Circuit General Information

- ⇒ "3.1 Refrigerant Circuit Components", page 21
- ⇒ "3.2 Refrigerant Circuit Component Allocation, Influence on High and Low Pressure Sides", page 22
- ⇒ "3.3 Overview Refrigerant Circuit", page 40
- ⇒ "3.4 Refrigerant Circuit with Electrically-Driven A/C Compressor", page 41
- ⇒ "3.5 Quick-Release Coupling Connections on Refrigerant Circuit", page 43
- ⇒ "3.6 Switches and Sensors on Refrigerant Circuit and Connections", page 50
- ⇒ "3.7 Electrical Components not on Refrigerant Circuit", page
- ⇒ "3.8 Refrigerant Circuit Pressures and Temperatures", page
- ⇒ "3.9 Pressure Gauge, Tests and Measurements", page 64
- ⇒ "3.10 A/C Service and Recycling Units", page 65
- ⇒ "3.11 Refrigerant Circuit Repair Information", page 66

3.1 Refrigerant Circuit Components



Caution

Non-approved tools or materials (such as leak stop additives) can cause damage or malfunctions in the system.

Only use tools and materials approved by the manufacturer.

The warranty is void if non-approved tools or materials are used.

- Any refrigerant circuit components submitted for quality observation must be sealed (use the caps that come with the ole is not replacement part) horised by AUDI AG. AUDI AG does not guarantee or accept any liability
- Replace damaged or leaking refrigerant circuit components. Refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacing", page 299.



Note

Until now, the following replacement parts (A/C compressor, reservoir, evaporator and condenser) were filled with nitrogen gas. This filling is being gradually discontinued. Therefore little or no pressure equalization is noticeable when unscrewing plugs from replacement parts.

3.2 Refrigerant Circuit Component Allocation, Influence on High and Low Pressure Sides

- ⇒ "3.2.1 Mechanically Driven A/C Compressor:", page 23
- "3.2.2 Electrically-Driven A/C Compressor, Vehicles with High-Voltage System", page 25
- ⇒ "3.2.3 Condenser", page 27
- ⇒ "3.2.4 Evaporator", page 27
- ⇒ "3.2.5 Heat Exchanger for Heat Pump Operation", page 28
- ⇒ "3.2.6 Fluid Collector", page 28
- ⇒ "3.2.7 Reservoir", page 29
- ⇒ "3.2.8 Restrictor", page 29
- ⇒ "3.2.9 Receiver/Dryer", page 31
- ⇒ "3.2.10 Expansion Valve", page 32
- ⇒ "3.2.11 Expansion Valve with Shut-Off Valve", page 32
- ⇒ "3.2.12 Refrigerant Shut-Off Valves", page 34
- ⇒ "3.2.13 Refrigerant Line with Inner Heat Exchanger", page 36
- ⇒ "3.2.14 Quick-Release Coupling Connections on Refrigerant Line", page 36
- ⇒ "3.2.15 O-Rings", page 38
- ⇒ "3.2.16 Refrigerant Circuit Pipes and Hoses", page 38
- ⇒ "3.2.17 Pressure Relief Valve", page 38
- ⇒ "3.2.18 Check Valves", page 39

The condenser, receiver/dryer and the restrictor or expansion valve to separate the high and low pressure liquid ends are located on the high pressure side.

High pressure results from the restrictor or expansion valve forming a constriction and causing the refrigerant to accumulate, thus leading to an increase in pressure and temperature.

Excess pressure occurs if too much refrigerant or refrigerant oil is used, the condenser is contaminated, the radiator fan is malfunctioning, the system is blocked or there is moisture in the refrigerant circuit (icing-up of restrictor or expansion valve).

The evaporator, evaporator temperature sensor and the A/C compressor to separate high and low pressure gas ends are located on the low pressure side.

A drop in system pressure can loccur due to loss of refrigerant; mmercial purposes, in part or in whole, is not restrictor or expansion valve (restrictions), AVC compressor and Godes not guarantee or accept any liability function or isod expansion. With respect to the correctness of information in this document. Copyright by AUDI AG. function or iced evaporator.

Mechanically Driven A/C Compressor: 3.2.1

The A/C compressor is driven by a ribbed belt or an input shaft, which is driven by the vehicle engine.

A/C Compressor with A/C clutch:

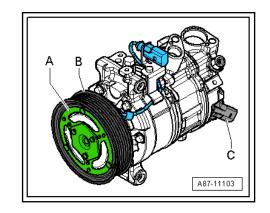
- ♦ An electro-magnetic clutch -A- attached to the A/C compressor provides the power link between the belt pulley -B- and A/C compressor crankshaft when the A/C system is switched on.
- An overload safeguard attached to the clutch plate or in the A/C compressor solenoid coil is tripped if the A/C compressor does not move freely, thus protecting the belt drive against overload.

A/C Compressor without A/C clutch:

An overload safeguard attached to the belt pulley -B- or installed in the A/C compressor drive unit is tripped if the A/C compressor does not move freely, thus protecting the belt

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The A/C compressor extracts the refrigerant gas from the evaporator, compresses it and sends it to the condenser.





Note

- The A/C compressor contains refrigerant oil, which can be mixed with refrigerant R134a under any temperature.
- The type plate lists the type of refrigerant required for the A/C compressor. A regulator valve regulates pressure within the specified range (control characteristics) on the low pressure side.
- A/C compressors with or without an A/C clutch are currently activated externally by a regulator valve -C-.
- On A/C compressors without an A/C clutch, the engine is only to be started if the refrigerant circuit is completely assembled.
- So that the A/C compressor does not get damaged when the is not refrigerant circuit is empty, the A/O clutch is turned off and ny liability the A/C Compressor Regulator Valve his N280 no longer DI AG. activated (A/C compressor runs at idle with engine).
- If the refrigerant circuit is empty, an A/C compressor without A/C Clutch - N25- (with A/C Compressor Regulator Valve -N280-) is switched to internal lubrication by way of a valve.
- Depending on the A/C compressor version, there may be a valve installed on the high pressure side of the A/C compressor, which prevents the liquid refrigerant from flowing back into the A/C compressor after the A/C system is turned off. If an A/C compressor with this valve is installed in a vehicle with a refrigerant circuit having an expansion valve, then it may take some time until the pressure in the high pressure side decreases (the expansion valve is cold and the pressure in the low pressure side quickly increases after it is turned off, the expansion valve closes and the refrigerant can flow slowly to the low pressure side). If the A/C compressor is switched on, the pressure on the low pressure side decreases, the expansion valve opens and the refrigerant can flow to the low pressure side.
- On A/C compressors with an electro-magnetic clutch -A- and a regulator valve -C-, the electro-magnetic clutch -A- is, for the most part, only activated when the regulator valve -C- is activated. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit.



3.2.2 Electrically-Driven A/C Compressor, Vehicles with High-Voltage System

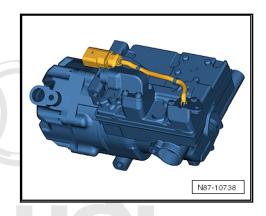


WARNING

Risk of short circuit

The A/C compressor works with up to 288 volts at 800 to 8,600 RPM.

Do not touch the A/C compressor when turning on the ignition or when activating the drive machines because of the short circuit risk.



- The A/C compressor extracts the refrigerant gas from the evaporator, compresses it and sends it to the condenser.
- . Copying for private or commercial purposes, in part or in whole, is not The electric motor for the A/C compressor is supplied with rised by AUDI AG. AUDI AG does not guarantee or accept any liability voltage by the Electric Drive Power and Control Electronics rectness of information in this document. Copyright by AUDI AG.
- The A/C Compressor Control Module J842- integrated in the A/C compressor controls the speed and thereby the output of the A/C compressor (Electrical A/C Compressor V470-) according to the request received by the data bus. Refer to ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for the A/C System and the Battery Regulation .
- There is no A/C Compressor Regulator Valve N280- installed in the electrically-driven A/C compressor.
- Check the attachment points on the A/C compressor and the bracket prior to installation. The contact surfaces must be clean and free of rust and grease. Otherwise, repair the contact surfaces with the Contact Surface Cleaning Set -VAS 6410- . Refer to ⇒ Electrical Equipment General Information; Rep. Gr. 97; Wire and Connector Repair .



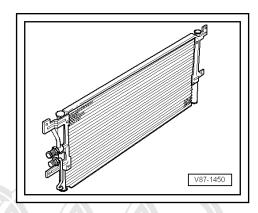
Note

- Check the amount of refrigerant oil in the new A/C compressor if the A/C Compressor Control Module - J842- is faulty. Do not flush the refrigerant circuit with R134a.
- The A/C Compressor Control Module J842- and the Electrical A/C Compressor - V470- are one component and are currently not able to be separated.
- There is no A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- installed in the electrically-driv-en A/C compressor. The A/C compressor output is regulated externally by the A/C compressor speed. Refer to ⇒ Wiring diagrams, Troubleshooting & Component locations and the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for the A/C System and the Battery Regulation .
- The electrically-driven A/C compressor currently functions according to the principle of a spiral charger (similar to a G-charger).
- The A/C compressor contains refrigerant oil, which can be mixed with refrigerant R134a under any temperature.
- The type plate lists the type of refrigerant required for the A/C compressor.
- The installed electronics regulate the A/C compressor power output (and the pressure on the low pressure side as a result) within the specified range (control characteristic) via the speed.
- The engine should only be started if the refrigerant circuit is completely assembled.
- The A/C compressor is supplied with a specific amount of oil that prevents the AC compressor from becoming the solution of guarantee or accept any liability aged when the refrigerant circuit is empty. This means that document. Copyright by AUDI AG. approximately 40 to 50 cm³ of refrigerant oil remains in the A/C compressor.
- The electrically-driven A/C compressor has a pressure relief valve like the mechanically-driven A/C compressor.
- Hybrid drive on vehicles with battery cooling is only possible with a fully charged A/C system in which there are no stored errors for the A/C system. Refer to ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for the A/C system and the Battery Regulation .
- After the installing the electrically-driven A/C compressor and the subsequent charging the refrigerant circuit, first start the A/C compressor using the "compressor cut-in" function of the basic setting. If refrigerant oil has accumulated in the A/C compressor compression chamber before installation due to improper storage, this could cause damage to the A/C compressor. Refer to ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for A/C System and Battery Regulation .
- Only activate the electrically-driven A/C compressor when the refrigerant circuit is filled. The A/C compressor may become damaged if the A/C compressor is run when the refrigerant circuit is empty. Refer to ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for A/Č System and Battery Regulation .

3.2.3 Condenser

The condenser diverts heat away from the compressed refrigerant gas to the surrounding air.

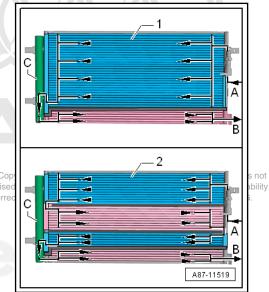
This condenses the refrigerant gas to fluid.





Note

- Depending on the refrigerant circuit design, the receiver/dryer can be installed (integrated) on the condenser or inside the condenser. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).
- The condenser is available in different versions and can only be differentiated by the part number on the outside. For version -1-, the condenser is divided into two areas "2 way condenser". For version -2-, the condenser is divided into pyright. Condenser is divided into four areas "4 way condenser".
- This illustration shows a condenser with the receiver/dryer -C- installed.
- The gaseous refrigerant enters at the connection -A- into the condenser. The refrigerant is then cooled inside the condenser and becomes fluid.
- The liquid refrigerant collects in the receiver/dryer -C- (with dryer) and flows through the lower cooling area towards the connection -B-.
- Depending on the design of the condenser (interior volumes, flow through, etc.), the refrigerant capacity in a refrigerant circuit may vary. Therefore always be sure of the correct version and allocation of the condenser. Refer to Refer to ⇒ "10.1 Refrigerant R134a Capacities", page 318 and the ⇒ Electronic Parts Catalog (ETKA).



3.2.4 **Evaporator**

There are different versions of the evaporator. Depending on the design and the function, the necessary heat energy of the flowing air (for example, an evaporator in the A/C unit or in the battery cooling module) or flowing coolant (for example near the high-voltage battery heat exchanger) is extracted for refrigerant evaporation. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



Note

Two versions of the evaporator are described in the following.

Αυδι

Evaporator in A/C Unit (or in Battery Cooling Module)

The liquid refrigerant evaporates in the evaporator pipe coils. The heat required for this is extracted from the air flowing on the evaporator ribbing. The air cools off. Refrigerant evaporates and is extracted with the absorbed heat by the A/C compressor.

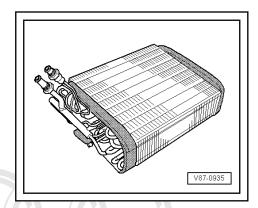
A defined amount of refrigerant is supplied to the evaporator by a restrictor or expansion valve. In systems with an expansion valve, the flow rate is regulated so that only gaseous refrigerant escapes the evaporator output.

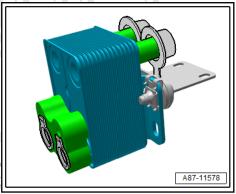
Evaporator / High-Voltage Battery Heat Exchanger (Chiller)

The liquid refrigerant evaporates in the evaporator (heat exchanger). The heat required for this is extracted from the coolant flowing through the evaporator. The coolant cools, the refrigerant evaporates and is extracted with the absorbed heat by the A/C compressor.

A defined amount of refrigerant is supplied to the evaporator by a restrictor (or expansion valve) and a shut-off valve. The flow rate of the refrigerant (or the coolant) is regulated so that only gaseous refrigerant escapes the evaporator output. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

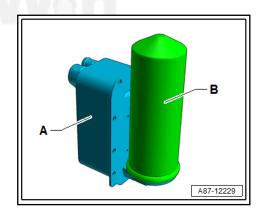
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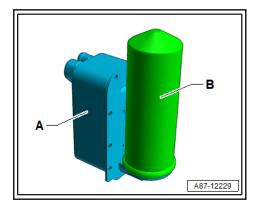
3.2.5 Heat Exchanger for Heat Pump Operation

The gaseous or vaporous refrigerant that is compressed by the A/C compressor becomes a liquid in the heater core -A-. At the same time, the heat that is released is transferred to the coolant flowing by. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



3.2.6 Fluid Collector

In some operating conditions (in heat pump operation, for example), the receiver/dryer (on the condenser, for example) is not incorporated into the refrigerant circuit. The fluid collector -B- collects the refrigerant, and stores it temporarily if a certain amount of refrigerant is not needed, and then directs it in an uninterrupted stream to the expansion valve (in front of the evaporator in the heater and A/C unit) or to the heat exchanger in the high-voltage system coolant circuit. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



3.2.7 Reservoir

The reservoir collects the vaporized and gaseous mixture coming from the evaporator to ensure the A/C compressor only receives gaseous refrigerant. Gaseous refrigerant is formed from the vapor.

The refrigerant oil flowing in the circuit is not retained in the reservoir because there is an oil extraction hole.

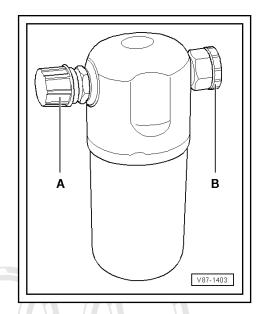
Moisture that has entered the refrigerant circuit during assembly is collected by a filter (desiccant bag) in the reservoir.

Gaseous refrigerant is extracted with oil by the A/C compressor.



Note

- Replace the reservoir if the refrigerant circuit has been open for a long time and moisture has penetrated inside, or if required due to a specific complaint. Refer to Refer to = "9 Refrigerant Circuit Components, Replacing", page 299
- Only remove the plugs -A- and -B- just before installing.
- A desiccant bag in an unsealed reservoir is saturated with moisture after a short period of time and cannot be used.
- When installing, note the arrow for the direction of flow if necessary.



3.2.8 Restrictor

Restrictor in Front of Evaporator

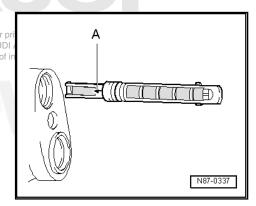
The restrictor creates a constriction. This restriction reduces the flow and separates the refrigerant circuit into high and ht. Copying for p low pressure sides. The refrigerant in front of the restrictor is sed by AUDI under a higher pressure and is warm. The refrigerant behind rectness of the restrictor is under lower pressure and is cool. There is a screen for contaminants in front of the constriction, and after the constriction there is a screen to atomize the refrigerant before it reaches the evaporator.



Note

- Arrow -A- on the restrictor points to the evaporator.
- Replace after each opening of the circuit.
- There are different versions, so pay attention to the different customer service information sources. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and to the ⇒ Electronic Parts Catalog (ETKA) .

Restrictor in Front of High-Voltage Battery Heat Exchanger (Chiller)



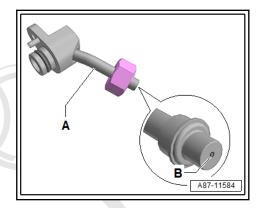
Refrigerant R134a Servicing - Edition 12.2022

The restrictor creates a constriction. This restriction reduces the flow and separates the refrigerant circuit into high and low pressure sides. The refrigerant in front of the restrictor is under a higher pressure and is warm. The refrigerant behind the restrictor is under lower pressure and is cool.



Note

- This illustration shows a refrigerant line -A- with a permanently installed restrictor -B- (without screen)
- The diameter of the illustrated restrictor hole -B- is approximately 0.7 mm. Depending on the version of the refrigerant line, this constriction is either permanently installed in the refrigerant line or is only inserted. A screen to separate floating deposits may be installed on the inserted version, which can block the restrictor hole.



- Before installing, check for debris, and clean of epigeplace if ght. Copying for private or commercial purposes, in part or in whole, is not necessary. permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability to the correctness of information in this document. Copyright by AUDI AG.
- There are different versions, so pay attention to the different customer service information sources. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and to the ⇒ Electronic Parts Catalog (ETKA) .

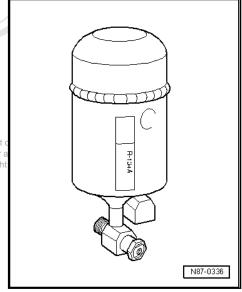


3.2.9 Receiver/Dryer

The receiver/dryer collects the fluid drops and then directs them in an uninterrupted stream to the expansion valve. Moisture that has entered the refrigerant circuit during assembly will be collected by the dryer in the receiver/dryer.

Note

- Replace the receiver/dryer if the refrigerant circuit has been open for a long time and moisture has penetrated inside, or if required due to a specific complaint. Refer to Refer to B "9 Refrigerant Circuit Componen
- Only remove the plugs just before installation.
- A desiccant bag in an unsealed receiver/dryer is saturated with moisture after a short period of time and cannot be used.
- When installing, note the arrow for the direction of flow if necessary.
- Depending on the refrigerant circuit design, the receiver/dryer can also be installed (integrated) on the condenser or inside the condenser. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- The procedure is different for each complaint depending on the version of the receiver/dryer and the dryer cartridge. If the receiver/dryer, for example, is attached to the condenser, then it can be replaced completely with the dryer cartridge. If the receiver/dryer, for example, is integrated inside the condenser, then the dryer cartridge, and any possible additional filter element, can be replaced separately, on most versions. If the receiver/dryer is integrated inside the condenser and it is not possible to replace the receiver/dryer or dryer cartridge separately, the entire condenser may need to be replaced. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).
- Depending on the refrigerant circuit design, the desiccant bag can also be installed in the condenser as the dryer cartridge. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and ⇒ Electronic Parts Catalog (ETKA) .





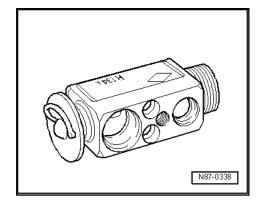
3.2.10 **Expansion Valve**

The expansion valve atomizes the flowing refrigerant and controls the flow rate so that the vapor is only gaseous at the evaporator output, depending on the heat transmission.



Note

- Be sure to note the correct part number when replacing the expansion valve. Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- There are different characteristic curves that correspond to the respective circuit. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- Depending on the A/C compressor version, there may be a valve installed on the high pressure side of the A/C compressor, which prevents the liquid refrigerant from flowing back into the A/C compressor once the A/C system is turned off. If an A/C compressor with this valve is installed in a vehicle with a refrigerant circuit having an expansion valve, then it may take some time until the pressure in the high pressure side decreases (the expansion valve is cold and the pressure in the low pressure side quickly increases after it is turned off, the expansion valve closes and the refrigerant can flow slowly to the low pressure side). If the A/C compressor is switched on, the pressure on the low pressure side decreases, the expansion valve opens and the refrigerant can flow to the low pressure side.



3.2.11 **Expansion Valve with Shut-Off Valve**



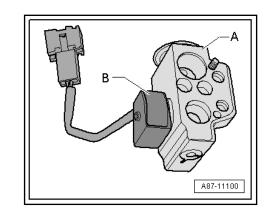
Note

Different versions of the shut-off valve are available with different functions and with different names. For example, the Hybrid Battery Refrigerant Shut-Off Valve 2 - N517- illustrated in the following is installed on an Audi Q5 hybrid in the battery cooling module. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).





- The expansion valve -A- with the Hybrid Battery Refrigerant Shut-Off Valve 2 Hybrid Battery Refrigerant Shut-Off Valve 2 N517- -B- atomizes the flowing refrigerant and regulates the refrigerant flow rate to the evaporator in the battery cooling module for the Hybrid Battery Unit - AX1- so that the vapor only becomes gaseous at the evaporator output, depending on the heat transmission.
- If the Hybrid Battery Refrigerant Shut-Off Valve 2 Hybrid Battery Refrigerant Shut-Off Valve 2 - N517- -B- is activated by the electronics and is open, it lets refrigerant flow through the expansion valve -A- to the evaporator in the battery cooling module.
- The expansion valve -A- with the Hybrid Battery Refrigerant Shut-Off Valve 2 Hybrid Battery Refrigerant Shut-Off Valve 2 - N517- -B- is installed on vehicles with a battery cooling module. It is activated during A/C system operation, if it is necessary to cool the Hybrid Battery Unit - AX1-
- If the Hybrid Battery Refrigerant Shut-Off Valve 2 Hybrid Battery Refrigerant Shut-Off Valve 2 - N517- -B- is activated by the electronics (for example, by the Battery Regulation Control Module - J840-), it is open and lets the refrigerant flow according to its control characteristic toward the evaporator in the battery cooling module.
- The Hybrid Battery Refrigerant Shut-Off Valve 2 Hybrid Battery Réfrigerant Shut-Off Valve 2 - N517- -B- attached to the expansion valve -A- is activated, for example, by the Battery Regulation Control Module - J840- . Refer to ⇒ Wiring diagrams, Troubleshooting & Component locations and ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for the A/C System and the Battery Regulation .
- If, for a vehicle with two evaporators (one in the A/C unit and one in the battery cooling module, for example on the Q5 Hybrid), the measured temperature on one of the evaporators corresponds to the specified value or the specified value falls short, but does not reach the required specified value on the other evaporator, the following adjustment is performed: the Battery Regulation Control Module - J840-activates the electric A/C compressor with increased speed (thereby increasing the A/C system cooling output and decreasing the pressure on the low pressure side as well as the evaporator temperature) via the Electric Drive Power and Control Electronics - JX1- and the A/C Compressor Control Module - J842- . If the specified value for the temperature falls short at one of the evaporators, the Battery Regulation Control Module Battery Regulation Control Module - J840-activates the Hybrid Battery Refrigerant Shut-Off Valve 1 -N516- or the Hybrid Battery Refrigerant Shut-Off Valve 2 - N517-, so that the evaporator which is too cold is no longer supplied with refrigerant Prefer to "Indiana" with refriger System.





Refrigerant Shut-Off Valves 3.2.12



Note

- Different versions of the shut-off valve are available with different functions and with different names. For example, the Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- illustrated in the following is installed on an Audi Q5 hybrid. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- There are various designations, depending on the function and the vehicle. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

Shut-Off Valves with Two States of Operation (Open or Closed)

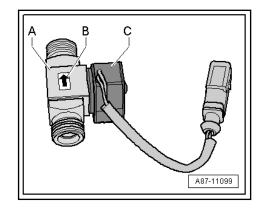
- Hybrid Battery Refrigerant Shut-Off Valve 1 N516- (for example on the Audi Q5 Hybrid)
- Heater and A/C Unit Refrigerant Shut-Off Valve N541- (for example on Audi A3 e-tron)
- Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not ess authorised by AUDI AG. AUDI AG does not guarantee or accept any liability High-Voltage Battery Heater Core Refrigerant Shulf-Office to the correctness of information in this document. Copyright by AUDI AG. Valve - N542- (for example on Audi A3 e-tron)
- Refrigerant Shut-Off Valve V424- (for example on Audi Q7 e-tron)



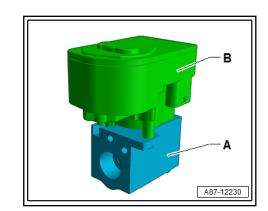
- If the shut-off valve -A- is not activated by the electronics, it is open and lets the refrigerant flow through to the evaporator in the A/C unit.
- For example, the shut-off valve -A- is installed on vehicles with the battery cooling module. It is activated in hybrid mode when no A/C system operation is desired for the passenger compartment, but battery cooling is necessary for the Hybrid Battery Unit - AX1-.
- Pay attention to the arrow -B- on the shut-off valve -Awhich shows the flow direction of the refrigerant (from the condenser to the evaporator in the A/C unit)
- The solenoid coil -C- attached to the shut-off valve is activated, for example, by the Battery Regulation Control Module -J840- . Refer to ⇒ Wiring diagrams, Troubleshooting & Component locations and ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for the A/C System and the Battery Regulation .
- For example, on a vehicle with two evaporators (one in the A/C unit and one in the battery cooling module, such as on the Audi Q5 Hybrid), if the measured temperature on one of the evaporators corresponds to the specified value or the specified value falls short, but the required specified value on the other evaporator is not reached, the following adjustment is performed: the relevant control module (for example, the Battery Regulation Control Module - J840- on the Audi Q5 hybrid) activates the electric A/C compressor with increased speed (thereby increasing the A/C system cooling output and decreasing the pressure on the low pressure side as well as the evaporator temperature) via the A/C Compressor Control Module - J842- . If the specified temperature value falls short at an evaporator, the relevant control module (for example, the Battery Regulation Control Module Battery Regulation Control Module - J840- on the Audi Q5 hybrid) activates the Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- or the Hybrid Battery Refrigerant Shut-Off Valve 2 - N517-, so that the evaporator that is too cold is no longer supplied with refrigerant. Refer to ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for the A/C System and ⇒ Heating, Ventilation and Air Con-Protec ditioning; Repy Gror 87ate Refrigerant Circuit (vehicle-specific permitted in his said thousand by A with respect to the correctness ss of information in this document. Copyright by AUDI AG.

Shut-Off Valves Regulated by Characteristic Curves

- Refrigerant Shut-Off Valve 2 N640- through Refrigerant Shut-Off Valve 5 - N643- (for example on Audi Q7 e-tron)
- Refrigerant Expansion Valve 1 N636- (for example on Audi Q7 e-tron)



- The shut-off valve -A- is activated via a stepper motor -B- by the respective control module using the characteristic curves (opened or closed).
- ♦ If the shut-off valve works as a regulator valve (for example, on the Audi Q7 as Refrigerant Expansion Valve 1 N636-), it is opened just enough so that the temperature for the heater core is reached. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual.
- ◆ Shut-off valves activated by stepper motors do not have a specified resting position. Therefore they must be set to a certain position (open or closed) before performing work on the refrigerant circuit. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- ◆ Depending on the refrigerant circuit design, multiple shut-off valves may be combined in a valve block (for example, on the Audi Q7 e-tron). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- ◆ The stepper motor is adapted and activated via the data wires (LIN bus) by the respective control module according to its component location. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



3.2.13 Refrigerant Line with Inner Heat Exchanger

In this refrigerant line, the warm liquid refrigerant flowing on the high pressure side releases energy into the gaseous or vaporous cold refrigerant flowing on the low pressure side. This increases the cooling efficiency of the A/C system private or commercial purpo

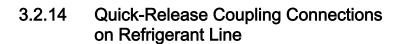
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Note

This illustration shows a refrigerant line with an inner heat exchanger as it is installed on the Audi A4 from MY 2008 and on the Audi A5 Coupe from MY 2008. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

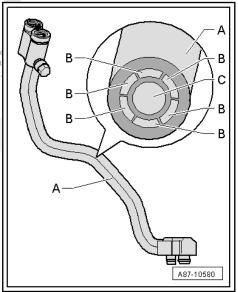
- A Refrigerant line with inner heat exchanger
- B Channels in the refrigerant line, in which the warm liquid refrigerant flows to the evaporator (refrigerant circuit high pressure side)
- C Channel in the refrigerant line, in which the gaseous or vaporous cold refrigerant flows to the A/C compressor (refrigerant circuit low-pressure side)





WARNING

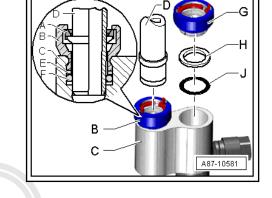
The quick-release coupling connections may only be unlocked and opened if the refrigerant circuit is empty.





Note

- This illustration shows the quick-release coupling connections with a refrigerant line with an inner heat exchanger as it is installed on the Audi A4 from MY 2008 and on the Audi A5 Coupe from MY 2008. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- The retaining ring -A- must be opened using the Air Conditioner Couplings Release Tool - T40149- in order to remove the refrigerant line -D-. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual).
- The quick-release coupling connections -B- and -G- are to be replaced after removing the respective refrigerant line with the corresponding support ring -E- or -H- and the corresponding O-ring -F- or -J-. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .

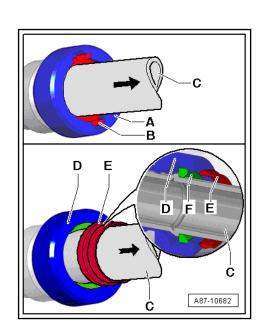


- A Retaining ring (in the quick-release coupling connection, high pressure side)
- B Quick-release coupling connection with "high pressure side" retaining ring permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability
- C Refrigerant line with respect to the correctness of information in this document. Copyright by AUDI AG
- D "High Pressure Side" Refrigerant Line
- E "High pressure side" support ring
- F "High pressure side" O-ring
- G Quick-release coupling connection with "low pressure side" retaining ring
- H "Low pressure side" support ring
- J "Low pressure side" O-ring



Note

- There are different versions of the quick-release couplings -A- and -D-. The refrigerant lines -C- can be released and removed in the same way for both versions of the quick-release couplings by using the Air Conditioner Couplings Release Tool -T40149/1- , for example.
- On the quick-release coupling -A- installed at the start of production, the check pins -B- become visible after the refrigerant line -C- is installed, if the locked refrigerant line -Cis pulled in the direction of the arrow.
- Beginning with MY 2010, as a running change, the quick-release coupling -D- installed and the refrigerant line -C- are being installed in the same manner as the quick-release coupling -A-. If the refrigerant line -C- is pulled in the direction of arrow after assembling, the ring -E- will come out of the quick-release coupling -D- and will show that the retaining ring -F- s completely latched to the refrigerant line -C-. Then the ring -E- can be removed from the refrigerant line



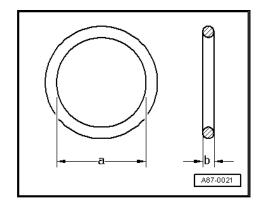
3.2.15 O-Rings

These rings seal off the connection points between individual components of the refrigerant circuit.

Only O-rings that are resistant to refrigerant R134a and the associated refrigerant oil may be used. Make sure they are original replacement parts.

O-Rings:

- Always use only once.
- Make sure diameters -a- and -b- are correct.
- Coat with refrigerant oil before installing. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).





Note

The O-ring color coding for refrigerant circuits with R134a has been discontinued. Black and colored O-rings are used. Refer to ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

3.2.16 Refrigerant Circuit Pipes and Hoses

The mixture of refrigerant oil and refrigerant R134a corrodes certain metals (such as copper) and alloys, and dissolves some hose materials. Therefore use original replacement parts only.

Pipes and hoses are joined by threaded connections or by special connectors.



Note

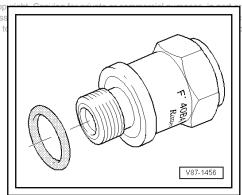
Note the tightening specifications for threaded connections and use the appropriate release tools for connectors.

3.2.17 **Pressure Relief Valve**

The pressure relief valve is installed on the A/C compressor enlitted unless per littled unless than the A/C compressor enlitted unless than the A/C compressor enlitt receiver/dryer.

At a pressure of approximately 38 bar (551.14 psi) positive pressure, the valve opens and closes again once pressure has dissipated (approximately 30 bar (435.11 psi)).

Refrigerant does not escape completely.

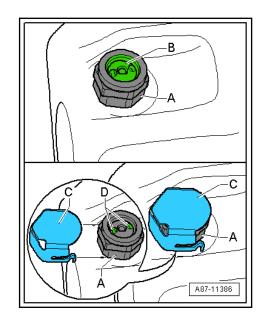


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Note

- Depending on the version, a transparent plastic washer -Bmay be installed on the pressure relief valve -A-, which breaks off as soon as the valve is activated.
- Depending on the pressure relief valve version -A-, an additional cover -C- can be slid onto the pressure relief valve -A-. If the pressure in the refrigerant circuit does rise above the pressure relief valve -A- opening pressure and the pressure relief valve opens, the refrigerant does not escape in one direction, but rather it is distributed through the openings -Dunder the cover -C-.
- If it is necessary to replace a pressure relief valve -A- pay attention to the tightening specification when installing (depending on the manufacturer of the A/C compressor and the version). On "Denso" (or "Nippondenso"), "Sanden" and "Zexel/ Valeo" A/C compressors, an O-ring is installed (tightening specification currently 10 Nm on "Denso" and "Zexel / Valeo" as well as 15 Nm on "Sanden" A/C compressors). On "Sanden" A/C compressors). a "Delphi" A/C compressor, for example, a seal is installed (tightening specification is currently 15 Nm).
- Replace the seals (seal or O-ring). Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- If the seals (seal or O-ring) that are installed on the pressure relief valve are not available as a replacement part, the removed seals may be used as an exception (check for damage before installing). If the removed seal is damaged or deformed if necessary replace with a commercially available component. Refer to the ⇒ Electronic Parts Catalog (ETKA).
- After charging the refrigerant circuit, check the installed pressure relief valve for leaks using an electronic leak detector, for example.



3.2.18 **Check Valves**

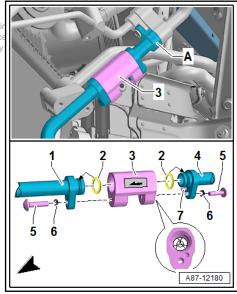
The check valves separate the refrigerant circuit in different areas.

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Note

- For example, the illustrated check valve -3- is installed on an Audi Q7 e-tron.
- The check valves in the refrigerant circuit have a specified residual pressure (approximately 0.1 bar (1.45 psi) or 100 mbar (1.45 psi)) in the flow direction. So that the refrigerant circuit can be completely evacuated (residual pressure less than 5 mbar (0.07 psi)), all electrically activated valves must be opened.
- Depending on the version, the flow direction may be marked with a sticker.



3.3 Overview - Refrigerant Circuit

⇒ "3.3.1 Refrigerant Circuit with Expansion Valve and Evaporator", page 40

"3.3.2 Refrigerant Circuit with Restrictor and Reservoir", page

3.3.1 Refrigerant Circuit with Expansion Valve and Evaporator

The following illustration only shows the general foundation of a refrigerant circuit. The design of the refrigerant circuit in the respective vehicle can be found in the vehicle-specific repair manual. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

- 1 -Evaporator
- 2 -**Expansion Valve**
- Extracting, Filling and Measuring Valve
- Level Indicator (not installed in R134a circuits)
- 5 -Receiver/Dryer with Dryer
- 6 -Condenser
- 7 -A/C Compressor



Note

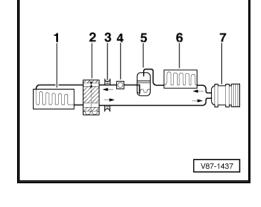
Arrows point in direction of refrigerant flow.

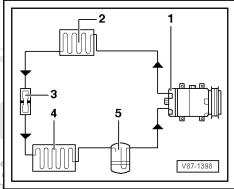
3.3.2 Refrigerant Circuit with Restrictor and Reservoir

The following illustration only shows the general foundation of a refrigerant circuit. The design of the refrigerant circuit in the respective vehicle can be found in the vehicle-specific repair manual. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

- 1 -A/C Compressor
- 2 -Condenser
- 3 -Restrictor
- Evaporator
- Reservoir 5 -

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Note

Arrows point in direction of refrigerant flow.



3.4 Refrigerant Circuit with Electrically-**Driven A/C Compressor**



Note

The following illustration shows an example of a refrigerant circuit as it is installed in an Audi Q5 hybrid. For the design of the refrigerant circuit in the respective vehicle, refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

Arrows point in direction of refrigerant flow.



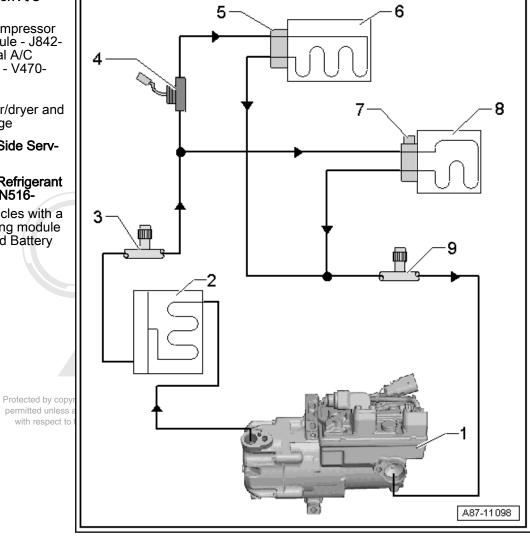


1 - Electrically-Driven A/C Compressor

 With A/C Compressor Control Module - J842and Electrical A/C Compressor - V470-

2 - Condenser

- ☐ With receiver/dryer and dryer cartridge
- 3 High Pressure Side Service Connection
- 4 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516-
 - Only on vehicles with a battery cooling module for the Hybrid Battery Unit - AX1- .





Note

The Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 -N516- is activated, for example, if it is necessary to cool the battery and no cooling is desired in the passenger compartment (open without activation).

5 - Expansion Valve

□ On the evaporator in the A/C unit

6 - Evaporator

■ Evaporator in the A/C Unit

7 - Expansion Valve with Hybrid Battery Refrigerant Shut-Off Valve 2 - N517-

- On the evaporator in the battery cooling module
- Only on vehicles with a battery cooling module for the Hybrid Battery Unit AX1-.



Note

The Hybrid Battery Refrigerant Shut-Off Valve 2 Hybrid Battery Refrigerant Shut-Off Valve 2 -N517- is activated when it is nec-



essary to cool the battery (closed without activation).

8 - Evaporator

- Evaporator in Battery Cooling Module
- Only on vehicles with a battery cooling module for the Hybrid Battery Unit AX1-.
- 9 Low Pressure Side Service Connection

3.5 **Quick-Release Coupling Connections** on Refrigerant Circuit

⇒ "3.5.1 Connections with Schrader Valve (Needle Valve)", page 44

⇒ "3.5.2 Connections with Primary Sealing Valve (Ball Valve)", page 44

⇒ "3.5.3 Service Connection Differences Depending on Refrigerant (R134a or R1234yf)", page 47

- Only valves and connections that are resistant to refrigerant R134a and refrigerant oil must be installed.
- There are different connections (outer diameter) for the high pressure and low pressure sides.
- Discharge the refrigerant circuit before removing valves or valve inserts.
- Always screw on the closure caps.

Allocation in the vehicle. Refer to ⇒ Heating, Ventilation and Air Conditioning, Repy Grand Refrigerant Circuit Vehicle specific whole, is not conditioning, and specific whole is not conditioning. repair manual), respect to the correctness of information in this document. Copyright by AUDI AG.



WARNING

There is a risk of freezing.

Refrigerant will leak out if refrigerant circuit is not discharged.

Refrigerant must be extracted before opening the refrigerant circuit. If the refrigerant circuit is not opened within 10 minutes of extraction, pressure may form in refrigerant circuit due to evaporation. Extract the refrigerant again.

3.5.1 Connections with Schrader Valve (Needle Valve)

- -A- Service connection (soldered in)
- -B- Valve insert (Schrader valve or needle valve)
- -C- O-ring (belonging to the valve)
- -D- Closure cap with seal



Note

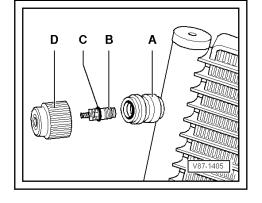
- After connecting, carefully install the service coupling hand wheel just far enough into the quick-release coupling adapter until the valve is securely opened inside the service connection (pay attention to the pressure gauge, do not put too much pressure on the valve).
- To remove and install the valve insert -B- when the refrigerant circuit is discharged, use, for example, an adapter from the Refrigerant Sockets - T10364-.
- Tighten the valve insert -B- very carefully because the tightening specification is very small.
- There are different versions of these valves and therefore there are different tightening specifications. Valve insert -Bwith VG5 (5.2 x 0.7 mm, tire valve) threads has a tightening specification of 0.4 Nm +/- 0.1 Nm; a valve insert with a M6 x 0.75 mm thread has a tightening specification of 0.9 Nm +/-0.1 Nm, and a valve insert with a M8 x 1.0 mm thread has a tightening specification of 2.0 Nm +/- 0.2 Nm.
- There are different versions of these valves, valve inserts and their respective closure caps. Be sure to use the correct valve insert version and the correct closure cap allocation. Refer to the ⇒ Electronic Parts Catalog (ETKA).

3.5.2 Connections with Primary Sealing Valve (Ball Valve)



WARNING

Before unscrewing the connection, connect the A/C service station and extract the refrigerant. Refrigerant circuit must be empty to avoid possible injury.





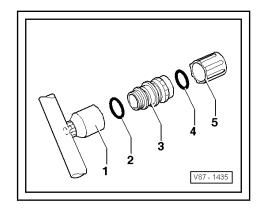




Connection with High-Pressure Valve

- Socket with internal thread (soldered in)
- 2 -O-ring (version and identification: black or colored. Refer to the ⇒ Electronic Parts Catalog (ETKA))
- Valve with an external thread and groove for the O-ring 3 -(identification: ball valve)
- 4 -Closure Cap Seal
- 5 -Closure Cap

Depending on the vehicle, there is not actually high pressure is not present at the high pressure side service connection during AG every A/C system operating condition (for example, on the Audi Q7 e-tron). Therefore the sensors installed in the refrigerant circuit must be used to check the A/C system function in these vehicles. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).





Note

- After connecting, carefully install the service coupling hand wheel just far enough into the quick-release coupling adapter until the valve is securely opened inside the service connection (pay attention to the pressure gauge, do not put too much pressure on the valve).
- For removing and installing the valve -3- when the refrigerant circuit is discharged, for example, use an adapter from the Refrigerant Sockets - T10364-.
- There are different versions of these valves (with internal or external threads). Therefore the tightening specifications may also differ. The currently used valves -3- with an M12 x 1.5 mm external thread have a tightening specification of 9 Nm +/- 1 Nm.
- There are different versions of these valves and their respective closure caps. Be sure to use the correct valve version and the correct closure cap allocation. Refer to the ⇒ Electronic Parts Catalog (ETKÅ) .

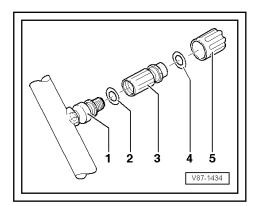
Connection with Low-Pressure Valve

- Socket with an external thread and groove for the O-ring (soldered in)
- 2 O-ring (version and identification: black or colored. Refer to the ⇒ Electronic Parts Catalog (ETKA))
- 3 Valve with Internal Thread
- 4 Closure Cap Seal
- 5 Closure Cap



Note

- Carefully install the service coupling hand wheel just far enough into the quick-release coupling adapter until the valve is securely opened in the service connection (pay attention to the pressure gauge, do not put too much pressure on the valve).
- For removing and installing the valve -3- when the refrigerant circuit is discharged, for example, use an adapter from the Refrigerant Sockets - T10364-.
- ◆ There are different versions of these valves (with internal or external threads). Therefore the tightening specifications may also differ. The currently used valves -3- with an M10 x 1.25 mm inner thread have a tightening specification of 9 Nm +/- 1 Nm.
- ◆ There are different versions of these valves and their respective closure caps. Be sure to use the correct valve version and the correct closure cap allocation. Refer to the ⇒ Electronic Parts Catalog (ETKA).









3.5.3 Service Connection Differences Depending on Refrigerant (R134a or R1234yf)



Note

- Only use valves and connections that are resistant to the respective refrigerant (R134a and / or R1234yf) and the corresponding refrigerant oil. Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- The service connections on the refrigerant circuits are designed so that only the service couplings provided for the intended refrigerant (R134a or R1234yf) can be connected.
- These illustrations show service connections that have a Schrader valve (needle valve or push pin) installed in them. Depending on the vehicle version, the refrigerant, etc., service connections with a primary sealing valve (ball valve) may also be installed (other technology). Refer to Refer to "3.5.2 Connections with Primary Sealing Valve (Ball Valve)", *page 44* .
- Allocation in the vehicle and on refrigerant circuit. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- There are different connections (outer diameter) for the high pressure and low pressure sides.
- Discharge the refrigerant circuit before removing valves or valve inserts. Refer to Refer to ⇒ "5.3.3 Refrigerant Circuit, Discharging with A/C Service Station", page 77.
- Valve, Removing and Installing at Service Connection on Low and High Pressure Side. Refer to Refer to ⇒ "3.5.1 Connections with Schrader Valve (Needle Valve)", page 44.
- Always install the closure caps with a seal.





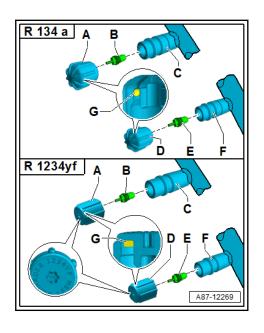
Service Connections (Refrigerant R134a and R1234yf)



WARNING

First connect the A/C service station and evacuate the refrigerant before removing the valves -B and E-. Refrigerant circuit must be empty to avoid possible injury. Refer to Refer to ⇒ "5.3.3 Refrigerant Circuit, Discharging with A/C Service Station", page 77

- High pressure side service connection closure cap -A- with seal -G-
- High pressure side valve insert (version: Schrader or needle valve) -B-
- High pressure side service connection -C-
- Low pressure side service connection closure cap -D- with
- Low pressure side valve insert (version: Schrader or needle valve) -E-
- Low pressure side service connection -F-









Note

- Depending on the manufacturer, there are different versions of the service connections -C and F- for refrigerant R134a and refrigerant R1234yf with different closure caps -A and Dand valves -B and E-. Pay attention to the right allocation. Refer to ⇒ Electronic Parts Catalog (ETKA)
- The closure caps -A and D- for the service connections on the R134a refrigerant circuit are currently black. The closure caps for the service connections on the R1234yf refrigerant circuit are currently gray. The type of refrigerant (such as "R1234yf") may also be imprinted on the closure caps.
- After connecting, carefully install the service coupling hand wheel just far enough into the quick-release coupling adapter until the valve -B and E- is securely opened in the service connection (pay attention to the pressure gauge, do not put too much pressure on the valve -B and E-).
- The service connections -C and F- on an R134a and R134yf refrigerant circuit are designed so that only certain service couplings can be connected for each of the refrigerants (different dimensions. Refer to ⇒ page 49).
- ♦ For example, the service connections -C and F- are soldered into a refrigerant line and therefore cannot be replaced separately.
- To remove and install the valves -B and E- (when the refrigerant circuit is discharged), use, for example, an adapter from the Refrigerant Sockets - T10364-.
- Due to the low tightening specification, only tighten the valves -B and E- carefully.
- There are different versions of these valves, therefore the tightening specifications are different. For a valve insert -Cwith a VG5 thread (5.2 x 0.7 mm, tire valve), the tightening specification is 0.4 Nm. +- 0.1 Nm, on a valve insert with a M6 x 0.75 mm thread, the tightening specification is 0.9 Nm +- 0.1 Nm and on a valve insert with a M8 x 1.0 mm thread, the tightening specification is 2.0 Nm +- 0.2 Nm.
- There are different versions of these valve caps -A and Dwhich means there are different tightening specifications. A valve cap with an M8 x 1mm or M10 x 1mm thread has a tightening specification of 0.4 Nm +- 0.1 Nm.

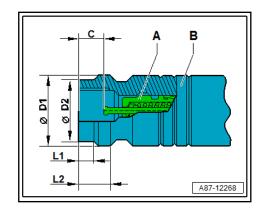
Service Connection Measurements



Refrigerant R134a Servicing - Edition 12.2022

- Valve insert -A- (there are different versions. Refer to the ⇒ Electronic Parts Catalog (ETKA)).
- Service connection -B- (depending on the refrigerant, there are different versions on the high and low pressure side)

Service Connection Measurements -B-	Refrigerant R134a Service Connection		Refrigerant R1234yf Service Connection	
	High- pressure side	Low- pres- sure side	High- pressure side	Low- pressure side
Outer diameter -D1-	16.0 mm	13.0 mm	17.0 mm	14.0 mm
Outer diameter -D2-	14.0 mm	11.0 mm	13.0 mm	12.0 mm
Section -L1-	4.6 mm	6.15 mm	9.0 mm	4.75 mm
Section -L2-	8.16 mm	9.16 mm	12.5 mm	7.2 mm
Valve installation position (not actuated) -C-	6.1 to 7.1 mm	6.1 to 7.1 mm	8.3 to 9.3 mm	8.3 to 9.3 mm



3.6 Switches and Sensors on Refrigerant **Circuit and Connections**

- ⇒ "3.6.1 A/C Refrigerant High Pressure Switch F23", page 51
- ⇒ "3.6.2 Magnetic Clutch High Pressure Switch F118", page <u>51</u>
- ⇒ "3.6.3 A/C Refrigerant Low Pressure Switch F73", page 51
- ⇒ "3.6.4 Refrigerant Circuit Connections with Switch Valve", <u>page 52</u>
- ⇒ "3.6.5 A/C Pressure Switch F129 ", page 52
- \Rightarrow "3.6.6 High Pressure Sensor G65 , Refrigerant Circuit Pressure Sensor G805 ", page 53
- ⇒ "3.6.7 A/C Pressure/Temperature Sensors", page 54
- ⇒ "3.6.8 A/C Compressor Regulator Valve N280 ", page 57
- ⇒ "3.6.9 A/C Compressor Speed Sensor G111", page 57
- ⇒ "3.6.10 Refrigerant Temperature Sensor G454", page 58



Note

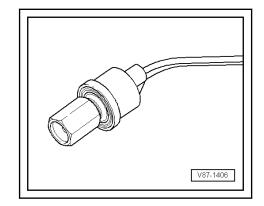
Switching pressures, removing and installing switches as well as switch arrangement and version. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



3.6.1 A/C Refrigerant High Pressure Switch -

Function:

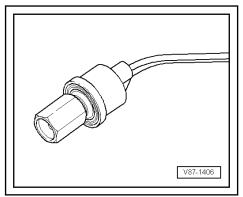
Switches the radiator fan to the next higher level (approximately 16 bar (232.06 psi)) when the pressure in the refrigerant circuit increases.



3.6.2 Magnetic Clutch High Pressure Switch - F118-

Function:

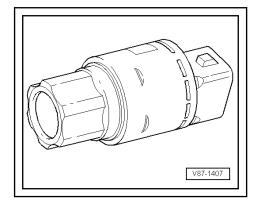
Switches off the A/C compressor when there is excessive pressure in the refrigerant circuit (approximately 32 bar (464.12 psi)).



3.6.3 A/C Refrigerant Low Pressure Switch -F73-

Function:

Switches off the A/C compressor when there is a decrease in the refrigerant circuit pressure (approximately 2 bar (29.01 psi)).







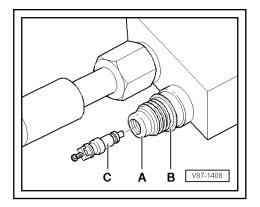
3.6.4 Refrigerant Circuit Connections with Switch Valve

- There are different threads for the switch on the high pressure and low pressure sides.
- Only valves and O-rings that are resistant to refrigerant R134a and refrigerant oil may be used.
- A Connection (soldered in)
- B O-Ring
- C Valve (with O-ring)



Note

To remove and install the valve insert -C- when the refrigerant circuit is discharged, use, for example, an adapter from the Refrigerant Sockets - T10364- (for the tightening specification, refer to ⇒ "3.5.1 Connections with Schrader Valve (Needle Valve)", page 44).



A/C Pressure Switch - F129-3.6.5

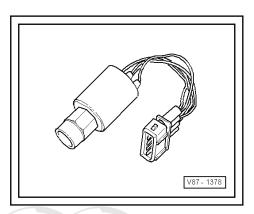
This pressure switch has three functions:

- 1. Switches the radiator fan to the next higher level when the pressure in the refrigerant circuit increases (approximately 16 bar (232.06 psi)).
- 2. Switches off the A/C system if the pressure (approximately 32 bar (464.12 psi)) is excessive (for example, due to insufficient engine cooling).
- 3. Switches off the A/C system if the pressure (approximately 2 bar (29.01 psi)) is insufficient (for example, loss of refrigerant).



Note

The A/C Pressure Switch - F129- replaces the A/C Refrigerant High Pressure Switch - F23- , A/C Refrigerant Low Pressure Switch - F73- and the Magnetic Clutch High Pressure Switch F118- .

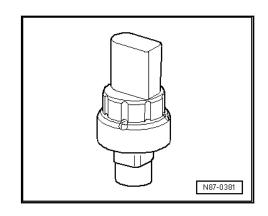






3.6.6 High Pressure Sensor - G65-, Refrigerant Circuit Pressure Sensor - G805-

- The High Pressure Sensor High Pressure Sensor G65- is installed instead of the A/C Pressure Switch - F129- or the A/C Pressure/Temperature Sensor - G395-
- The Refrigerant Circuit Pressure Sensor Refrigerant Circuit Pressure Sensor - G805- replaces the High Pressure Sensor High Pressure Sensor - G65- on certain vehicles from a specific version and from a specific date of manufacture.
- When voltage is applied, the one version of the High Pressure Sensor High Pressure Sensor - G65- generates a square-wave signal and the other one generates a data telegram. This signal changes along with the pressure in the system. When voltage is applied, the other version and the Refrigerant Circuit Pressure Sensor Refrigerant Circuit Pressure Sensor in G805- exchange information via the data bus (for example, via the "LIN bus") with the corresponding control module. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- On an Audi A3 from MY 2005 and Audi Q3, a High Pressure Sensor High Pressure Sensor - G65- is installed, for example, which emits its measured values as a square-wave signal to the corresponding control module (for example, to the A/C Control Module - J301- or the Climatronic Control Module - J255-). On an Audi Q7 from MY 2016, a High Pressure Sensor High Pressure Sensor - G65- is installed, for example, which sends its measured values via a "LIN bus". Refer to ⇒ Vehicle Diagnostic Tester ("OBD" function or A/C system "Guided Fault Finding") and ⇒ Wiring diagrams, Troubleshooting & Component locations.
- The refrigerant circuit pressure sensor Refrigerant Circuit Pressure Sensor - G805- is installed for example for Audi A3 2013> and exchanges information via the Data bus with the part or in whole, is not corresponding control module: (for Audi A3 for example with or accept any liability the A/C Control Module: 4301 corsthe Climatronic Control pyright by AUDI AG. Module - J255- . Refer to ⇒ Wiring diagrams, Troubleshooting & Component locations.
- There are different versions of the A/C Pressure/Temperature Sensor - G395-, the Refrigerant Circuit Pressure Sensor - G805- and the High Pressure Sensor - G65- . Depending on the version, they currently only differ externally by the part number. Therefore pay attention to the correct allocation when replacing (for the part number, refer to the ⇒ Electronic Parts Catalog (ETKA)). Reason: These sensors produce different signals that can only be evaluated by the respective control modules. Refer to \Rightarrow Vehicle Diagnostic Tester (function "OBD" or "Guided Fault Finding" for the A/C system) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- The High Pressure Sensor High Pressure Sensor G65- and the Refrigerant Circuit Pressure Sensor Refrigerant Circuit Pressure Sensor - G805- only transmit the measured value for the refrigerant circuit pressure to the connected control module. The A/C Pressure/Temperature Sensor A/C Pressure/Temperature Sensor - G395- transmits the measured value for the refrigerant circuit pressure and the measured temperature to the connected control module. Even though only the pressure signal is evaluated on a vehicle, an A/C Pressure/Temperature Sensor A/C Pressure/Temperature Sensor - G395- is not and must not be installed on a vehicle for which a High Pressure Sensor High Pressure Sensor -G65- or a Refrigerant Circuit Pressure Sensor Refrigerant



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Circuit Pressure Sensor - G805- is intended. Refer to the ⇒ Electronic Parts Catalog (ETKA).

The downstream control modules (Radiator Fan Control Module, Engine Control Module, Front A/C Display Control Head - E87- or Climatronic Control Module - J255- , etc.) use this signal to calculate the refrigerant circuit pressure and activate the radiator fans, the motor, and the A/C Clutch - N25- if necessary, or to change the activation of the A/C Compressor Regulator Valve - N280- . Refer to ⇒ Vehicle Diagnostic Tester ("OBD" function or "Guided Fault Finding") and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

3.6.7 A/C Pressure/Temperature Sensors

There are different versions of this sensor with different functions and with different names. For the exact name, allocation and information about the respective function, refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



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There is a risk of freezing.

Refrigerant may leak out if the refrigerant circuit is not discharged.

There are different versions of this sensor (sensor for a connection on the refrigerant circuit with or without a valve). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

- Before loosening the sensor threaded connection, check the version. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual).
- On a sensor for a connection on the refrigerant circuit without a valve. The refrigerant must be extracted before loosening the threaded connection. If the sensor is not removed within 10 minutes after extraction, pressure may build up in refrigerant circuit due to evaporation. Extract the refrigerant again.

Sensor for Connection with Valve on Refrigerant Circuit



Note

- There are different versions of this sensor with different functions and with different names. For example, the following illustrated A/C Pressure/Temperature Sensor - G395- is installed on an Audi A4, Audi Q5, and Audi Q5 hybrid. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- There are various designations, depending on the function and the vehicle. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

Possible names for this sensor

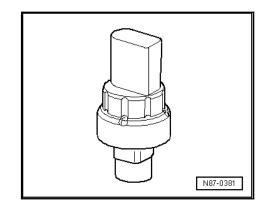
- ◆ A/C Pressure/Temperature Sensor G395- (for example on Audi Q5 hybrid)
- High Pressure Sensor G65- (for example on Audi A4)
- Refrigerant Circuit Pressure Sensor G805- (for example on Audi A3 e-tron)



Note

The Refrigerant Circuit Pressure Sensor - G805- is installed instead of the High Pressure Sensor - G65- or the A/C Pressure/Temperature Sensor - G395- , for example. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

- There are different versions of the A/C Pressure/Temperature Sensor - G395-, the Refrigerant Circuit Pressure Sensor - G805- and the High Pressure Sensor - G65- . Depending on the version, they currently only differ externally by the part number. Therefore pay attention to the correct allocation when replacing (for the part number, refer to the ⇒ Electronic Parts Catalog (ETKA)). Reason: These sensors produce different signals that can only be evaluated by the respective control modules. Refer to ⇒ Vehicle Diagnostic Tester (function "OBD" or "Guided Fault Finding" for the A/C system) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- When voltage is applied, the A/C Pressure/Temperature Sensor G395- and the Refrigerant Circuit Pressure Sensor - G805- exchange information via the data bus (for example via the "LIN bus") with the corresponding control module. The relevant control module uses this information to calculate the pressure (and temperature) in the refrigerant circuit and any faults detected are reported to the control module.
- The A/C Pressure/Temperature Sensor A/C Pressure/Temperature Sensor - G395- transmits the measured value for the refrigerant circuit pressure and the measured temperature to the connected control module. The Refrigerant Circuit Pressure Sensor Refrigerant Circuit Pressure Sensor - G805- only transmits the measured value for the refrigerant circuit pressure to the connected control module. Even ivate or commercial purposes, in part or in whole, is not if only the pressure signal is evaluated in massure signal is evaluated in the pressure signal is evaluated in massure signal as evaluated in massure signal is evaluated in the same signal in the same signal is evaluated i no Refrigerant Circuit Pressure Sensor Refrigerant Circuit information in this document. Copyright by AUDI AG. Pressure Sensor - G805- is or will be installed in a vehicle in which an A/C Pressure/Temperature Sensor A/C Pressure/Temperature Sensor - G395- is intended. Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- The temperature measured by the A/C Pressure/Temperature Sensor - G395- differs from the actual refrigerant temperature in the refrigerant circuit because of the A/C Pressure/Temperature Sensor A/C Pressure/Temperature Sensor - G395- version and its component location. Therefore it is not currently evaluated by all control modules and is not used to regulate the A/C system. Refer to ⇒ Heating Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- For example, the Climatronic Control Module J255- display control head or the Vehicle Electrical System Control Module J519- use this information to calculate the refrigerant circuit pressure and activates the control modules downstream (radiator fan control module, engine control module, etc.) via the data bus. These control modules then actuate, for example, the A/C Clutch - N25-, the radiator fans and the







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motor. Refer to ⇒ Vehicle Diagnostic Tester (function "OBD" or "Guided Fault Finding" and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

Sensor for Connection without Valve on Refrigerant Circuit



Note

- There are different versions of this sensor with different functions and with different names. For example, the following illustrated A/C Pressure/Temperature Sensor - G395- is installed on an Audi Q7 e-tron. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual)
- There are various designations, depending on the function and the vehicle. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

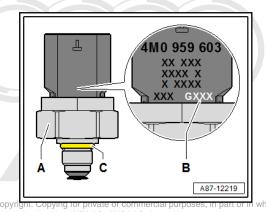
Possible names for this sensor

- A/C Pressure/Temperature Sensor G395- (for example on Audi Q7 e-tron)
- A/C Pressure/Temperature Sensor 2 G826- (for example on Audi Q7 e-tron)
- A/C Pressure/Temperature Sensor 3 G827- (for example on Audi Q7 e-tron)

There are different versions of this sensor -A-. Depending on the version, their exterior currently only differs in part number, or in imprinted designation -B- with the same part number. Therefore pay attention to the correct allocation (part number and designation) when replacing. Refer to the ⇒ Electronic ected by copyright. Copyright Copyri ditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific re-specific re-s pair manual).

These sensors exchange information with the respective control module via the data bus (for example via the "LIN bus") when voltage is applied. The relevant control module uses this information to calculate the pressure (and temperature) in the refrigerant circuit and any faults detected are reported to the control module. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

The respective control module uses this information to calculate the refrigerant circuit pressure and to activate the control modules or components downstream (radiator fan control module, pumps, valves etc.) via the data bus according to the specifications. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).





3.6.8 A/C Compressor Regulator Valve -

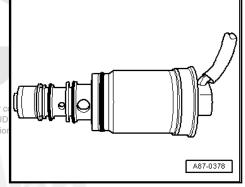
The regulator valve is installed in the A/C compressor. It is activated by the Front A/C Display Control Head - E87-, the A/C Control Module - J301- or the Climatronic Control Module - J255- (depending on the vehicle, possibly via the data bus and an additional control module). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). Pressure on the low pressure side is influenced by the regulator valve and thus regulates the temperature in the evaporator.

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Note

The A/C Compressor Regulator Valve - N280- is a component of the A/C compressor and cannot be replaced separately on all A/C compressors. Refer to the ⇒ Electronic Parts Catalog (ETKA) and Refer to ⇒ "9.1.8 A/C Compressor Regulator Valve N280 , Removing, Installing and Replacing", page 310 .



3.6.9 A/C Compressor Speed Sensor -

Inductive sensor

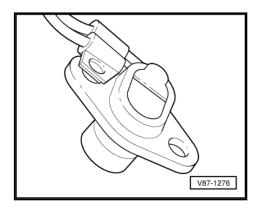
The Front A/C Display Control Head - E87- or the Climatronic Control Module - J255- uses the sensor pulses (four per compressor revolution) and the engine speed to calculate belt slip.

If the belt slip exceeds a specified value, the A/C compressor is switched off by the control module via the A/C clutch.



Note

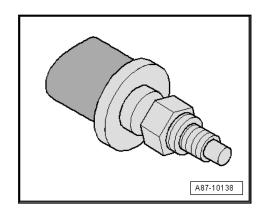
- Installed in Audi vehicles with an A/C compressor driven via a ribbed belt and Zexel compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".



3.6.10 Refrigerant Temperature Sensor -

The refrigerant temperature sensor (with temperature-dependent resistance) is installed in the high pressure line near the A/C compressor, for example (only for certain vehicles that were built within a certain time frame, for example Audi Q7 from MY 2007).

In the refrigerant circuit, there is a direct correlation between temperature and pressure. Should there be too little refrigerant in the refrigerant circuit, the temperature in the refrigerant circuit increases more steadily than intended for this pressure when the A/C system is operating.





Note

- Installed on the Audi Q7 with certain engines, for example. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and ⇒ Wiring diagrams, Troubleshooting & Component locations.
- The Climatronic Control Module J255- display control head evaluates the pressure and temperature in the refrigerant circuit and switches the A/C compressor off if the temperature exceeds the value that was stored for this pressure. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and ⇒ Vehicle Diagnostic Tester ("OBD" function or "Guided Fault Finding" for the A/C system).

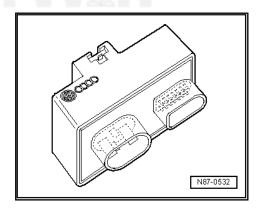
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Electrical Components not on Refriger prised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG. 3.7 ant Circuit

⇒ "3.7.1 Radiator Fan Control Module J293", page 58

3.7.1 Radiator Fan Control Module - J293-

This control module switches on and off the A/C clutch and therefore the A/C compressor. It controls the radiator fans and calculates the refrigerant circuit pressure in vehicles with a High Pressure Sensor - G65- . Refer to ⇒ Wiring diagrams, Troubleshooting & Component locations and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual).





3.8 Refrigerant Circuit Pressures and Temperatures

⇒ "3.8.1 Refrigerant Circuit with Expansion Valve", page 60

3.8.2 Refrigerant Circuit with Restrictor and Reservoir", page



Caution

When performing work on the refrigerant circuit, observe all general safety precautions and pressure canister reg-

The pressures and temperatures in the refrigerant circuit depend on the current operating conditions (such as engine speed, radiator fan level 1, 2 or 3, engine temperature, A/C compressor on or off) as well as on the effects of ambient influences (such as ambient temperature, humidity, desired cooling output).

In vehicles with a A/C Compressor Regulator Valve - N280-, the pressure is altered on the low pressure side by the activation of the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- .

On vehicles with an Electrical A/C Compressor - V470-, the refrigerant circuit pressure (high and low pressure sides) is regulated via the A/C compressor speed.

On vehicles with an Electrical A/C Compressor - V470-, where the A/C system not only cools the vehicle interior but also cools the high-voltage system components and is used as a heat pump to heat the vehicle interior, other conditions, pressures and temperatures in the refrigerant circuit apply (for example, in the Audi Q7 e-tron). Use the > Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

For this reason, values indicated in the following table are valid only as reference points. They are attained at an engine speed of 1500 to 2000 RPM and an ambient temperature of 20 °C (68 °F) after approximately 20 minutes.

Protected by copyright, Copyring for private or commercial purposes, in part or in whole, is not The pressure gauge battery connections intended for the pressure day AUDI AG. AUDI AG does not guarantee or accept any liability sure measurement are indicated in the vehicle-specific refrigerant circuit. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair man-

At 20 °C (68 °F) with the engine not running, the pressure in the refrigerant circuit is 4.7 bar (68.17 psi). Refer to Refer to <u>.3.3 Refrigerant R134a Vapor Pressure Table", page 7</u> (vapor pressure table).



ual).

Note

Pressure is measured in different units: 1 MPa (mega Pascal) corresponds to 10 bar (145.04 psi) positive pressure or 145 psi. 1 bar (14.5 psi) absolute pressure corresponds to 0 bar (0 psi) positive pressure and thus to the ambient pressure (atmospheric pressure).

3.8.1 Refrigerant Circuit with Expansion



Note

Applies to vehicles with an Electrical A/C Compressor - V470only with restrictions.

- HP- High pressure side of refrigerant circuit.
- LP- Low pressure side of refrigerant circuit.

Component	Aggregate state of refrigerant	Pressure (bar pressure)	Temperature in Celsius
-1- Evaporator, from input to output	Vapor	approximately 1.2 bar (17.4 psi) 1)1	approximately -7 °C 2)2
-2- Expansion valve	Fluid, released as vapor	approximately 14 bar (203.05 psi)	approximately + 55 °C (high pressure side), reduces to -7 °C (19.4 °F) (low pressure side)
-3-High pressure switch / high pressure sensor	Fluid	approximately 14 bar (203.05 psi)	approximately +55 °C
-4- HP-side service con- nection and -5- receiver/dryer	Fluid	approximately 14 bar (203.05 psi)	approximately +55 °C
-6- Condenser	From gas (at input) through vapor to fluid (at output)	approximately 14 bar (203.05 psi)	From approximately +65 °C (at input) to approximately + 55 °C (at output)
-7- pressure relief valve and -8- A/C compressor, HP- side	Gas	approximately 14 bar (203.05 psi)	approximately +65 °C
-9- A/C compressor, low pressure side	Gas	approximately 1.2 bar (17.4 psi) 1)1	approximately -1 °C (30.2 °F) ²⁾ 2
-10- Pre-volume (not present in all vehicles) and -11- LP-side service connection	Gas	approximately 1.2 bar (17.4 psi) ¹⁾ 1	approximately -1 °C (30.2 °F) ²⁾ 2

^{1) 1-} Pressure in refrigerant circuits is maintained at approximately 2 bar (29.01 psi) absolute pressure (corresponds to approximately 1 bar (14.5 psi) positive pressure) by a regulating A/C compressor, despite changing heat transfer and varying engine speeds. However, this applies only within the performance range of the A/C compressor; if the performance limits of the A/C compressor are exceeded, "8 Pressures, Checking", page 208 the pressure increases. Refer to Refer to ⇒



^{2) 2 -} Temperature in refrigerant circuits is maintained within the A/C compressor control range by a regulating A/C compressor, despite changing heat transfer and varying engine speeds. However, this applies only within the performance range of the A/C compressor; if the performance limits of the A/C compressor are exceeded, the temperature increases. Refer to Refer to ⇒ "8 Pressures, Checking", page 208





Note

- A/C compressors that do not regulate their output are switched off by the respective control module via the A/C Compressor Řegulator Valve - N280- at an evaporator temperature below 0 °C (32 °F).
- ♦ For vehicles with a A/C Compressor Regulator Valve -N280- , the pressure on the low pressure side is changed by the valve activation.
- Temperature and pressure in the refrigerant circuit in vehicles with two evaporators and two expansion valves correspond to those in vehicles with only one evaporator and one expansion valve (parallel switching). Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not
- Depending on the version of the refrigerant circuit as on the correctness of information in this document. Copyright by AUDI AG. ponent with an inner heat exchanger may be installed (for example, on the Audi A4 from MY 2008 and on the Audi A5 Coupe from MY 2008, a refrigerant line with an inner heat exchanger). In the inner heat exchanger, the warm liquid refrigerant flowing on the high pressure side releases energy into the gaseous or vaporous cold refrigerant flowing on the low pressure side. This increases the efficiency of the A/C system. Refer to Refer to ⇒ "3.2.13 Refrigerant Line with <u>Inner Heat Exchanger", page 36</u> .

Arrows point in direction of refrigerant flow.

HP- High pressure side of refrigerant circuit.

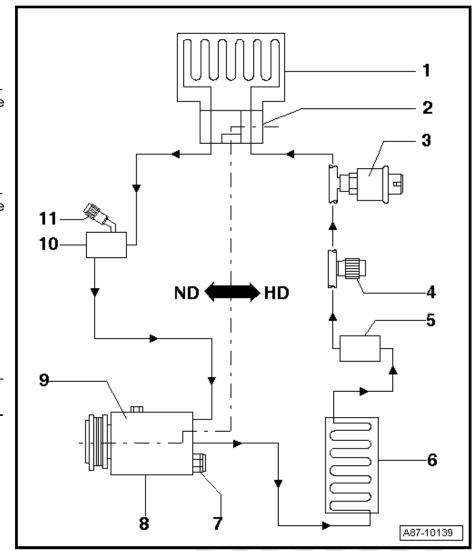
LP- Low pressure side of refrigerant circuit.



- 1 Evaporator
- 2 Expansion Valve

3 - High Pressure Switch / High Pressure Sensor

- ☐ There are different versions depending on the vehicle
- 4 High Pressure Side Service Connection
- 5 Receiver/Dryer
 - ☐ There are different versions depending on the vehicle
- 6 Condenser
- 7 Pressure Relief Valve
- 8 A/C Compressor, High Pressure Side
- 9 A/C Compressor, Low Pressure Side
- 10 Damping Chamber
 - Not present on all vehi-
- 11 Low Pressure Side Service Connection



3.8.2 Refrigerant Circuit with Restrictor and Reservoir

HP- High pressure side of refrigerant circuit.

LP- Low pressure side of refrigerant circuit.

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Component	Aggregate state of refrigerant	Pressure (bar pressure)	naTemperature in Celsius A
-1- A/C compressor, high pressure side	Gas	up to 20 bar (290.08 psi)	up to +70 °C
-2- Condenser	From gas to vapor to fluid	up to 20 bar (290.08 psi)	up to +70 °C
-3- Restrictor	From fluid to vapor	High pressure side up to 20 bar (290.08 psi); low pressure side greater than 1.0 bar (14.5 psi)	High pressure side up to +60 °C; low pressure side warmer than -4 °C (24.8 °F)
-4- Evaporator	From vapor to gas	Greater than 1.0 bar (14.5 psi)	Warmer than -4 °C
-5- Reservoir	Gas		
-6- A/C compressor, low pressure side	Gas		

Pressures on the low pressure side are maintained at approximately 2 bar (29.01 psi) absolute pressure (corresponds to

approximately 1 bar (14.5 psi) positive pressure) by a "regulating" A/C compressor also at various engine speeds. However, this applies only within the performance range of the A/C compressor; if the performance limits of the A/C compressor are exceeded. Refer to Refer to ⇒ "8 Pressures, Checking", page



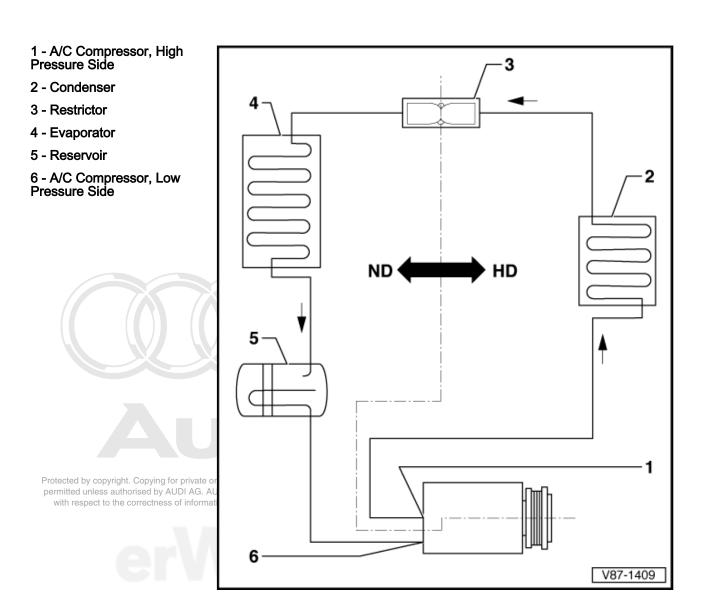
Note

For vehicles with a A/C Compressor Regulator Valve - N280-, the pressure on the low pressure side is changed by the valve activation.

Arrows point in direction of refrigerant flow.

HP- High pressure side of refrigerant circuit.

LP- Low pressure side of refrigerant circuit.



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3.9 Pressure Gauge, Tests and Measurements

⇒ "3.9.1 Pressure Gauge Uses", page 64

Pressure gauge display

- Temperature scale for refrigerant R134a CF3-CH2F or CH2F-CF3.
- Pressure scale



Note

Pressure is measured in different units: 1 MPa (mega Pascal) corresponds to 10 bar (145.04 psi) positive pressure or 145 psi. 1 bar (14.5 psi) absolute pressure corresponds to 0 bar (0 psi) positive pressure and thus to the ambient pressure (atmospheric pressure).

The pressure gauge may have one or more temperature scales in addition to the pressure scale. The R134a scale values are assigned according to the vapor pressure table. Since various refrigerants create different vapor pressures at the same temperature, each temperature scale is identified for the respective refrigerant.

3.9.1 **Pressure Gauge Uses**

Pressure and Temperature Measurement at Refrigerant Circuit

- High pressure gauge measures pressure and temperature, which expand uniformly from the A/C compressor output via the condenser up to the constriction (restrictor, or expansion valve) with A/C system switched on.
- Low pressure gauge measures pressure and temperature, which expand uniformly from the constriction (restrictor, or expansion valve) via the evaporator up to the A/C compressor input with the A/C system switched on.



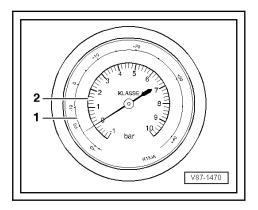
Note

The relationship between pressure and temperature indicated on the gauges only exists in a refrigerant circuit that contains liquid or vapor, but not gas. In a gaseous state, the temperature is approximately 10 °C to 30 °C (50 °F to 86 °F) higher than indicated on the pressure gauge.

Verification of Refrigerant in a Closed Reservoir

Refrigerant R134a is present in a reservoir canister or in a refrigerant circuit when the temperature indicator on the pressure gauge matches the refrigerant temperature (standing fluid of adopts the ambient temperature) IDI AG does not guarantee or accept any liability

A closed cylinder or a refrigerant circuit that has been switched off is empty when the temperature indicator on the pressure gauge is below the temperature of the refrigerant.







Note

The relationship between pressure and temperature indicated on the gauges no longer applies if no liquid is present and the pressure is built up solely by gas.

3.10 A/C Service and Recycling Units

- ⇒ "3.10.1 Extraction System Group Classifications", page 65
- ⇒ "3.10.2 Charging Systems not Requiring a Permit", page 66

At this time, A/C service units for extracting, cleaning and charging refrigerant for motor vehicle A/C systems are available on the market from various manufacturers.

Only certain A/C service stations (with appropriate auxiliary equipment and various adapters if necessary) can be used for cleaning (flushing with refrigerant R134a) the refrigerant circuit. Refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93.

3.10.1 Extraction System Group Classifications



WARNING

When performing work on the refrigerant circuit and when handling refrigerant, observe all general safety precautions and pressure canister regulations.

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Note

- The A/C service and recycling units used in motor vehicle workshops are extraction and charging systems not requiring a permit (Group "3") but which are only to be operated by qualified personnel. Instructions for unit operation and maintenance can be found in the relevant manufacturer's documentation.
- Extraction and charging systems of groups "1" and "2" are not used in motor vehicle workshops.

Extraction and Charging Systems of Group "3":

Mobile extraction and charging systems for charging compressed-gas canisters permanently connected to the system.

The refrigerant or refrigerant/oil mixture is transferred to compressed-gas canisters which are permanently connected to the mobile systems. In accordance with § 3 Para. 5 No. 3 of pressure canister regulations, compressed-gas canisters are classified as pressure canisters in this case.

The charging systems require:

- No permit
- No expert testing as the gas is transferred to a compressedgas canister, which is classified as a pressure canister. Systems used for transfer from these pressure canisters to compressed-gas canisters for supplying to third parties do however require a permit and are subject to mandatory testing).

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3.10.2 Charging Systems not Requiring a Per-



WARNING

When performing work on the refrigerant circuit and when handling refrigerant, observe all general safety precautions and pressure canister regulations.

Charging systems not requiring a permittable conversity servine for private or commercial purposes, in part or in whole, is not transferring compressed gases to mobile compressed gases can broad uses and the compressed gases to mobile compressed gases can be mobile compressed. isters for internal use only.

Note:

Some A/C service units are charging systems not requiring a permit. When working with such equipment, the refrigerant is not transferred to mobile compressed-gas canisters, but rather into a permanently-installed charging cylinder with visible level gauge and floater switch.

Recommendation:

It is advisable to use a portable charging cylinder with visible level gauge and pressure relief valve for surplus refrigerant for internal use.

Attention must be paid to various technical regulations for compressed gases (for example TRGS 400, TRGS 402, TRGS 407 TRGS 510 TRGS 725 / TRBS3145) when transferring compressed gases to other compressed-gas canisters.

3.11 Refrigerant Circuit Repair Information



WARNING

When performing work on the refrigerant circuit, observe all general safety precautions and pressure canister regulations.

Special Tools and Accessories:

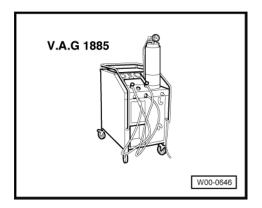
To perform repairs on an A/C system properly and competently:

- Special tools and materials are necessary and are listed here: Refer to <u>⇒ "11 Tools and Testing Equipment", page</u> 405
- The basic instructions for using of leak detectors must be observed. Refer to Refer to ⇒ *5.6 Refrigerant Circuit, Determining Leaks", page 186.
- Expert knowledge is required.



Note

Draining of refrigerant into the environment is not permitted. Refer to Refer to ⇒ "4 Laws and Regulations", page 67 (for laws and regulations).





4 Laws and Regulations

⇒ "4.1 Laws and Regulations", page 67



Note

The laws and regulations listed below are applicable in Germany. Different or additional laws and regulations may apply in other countries.

4.1 Laws and Regulations

⇒ "4.1.1 Refrigerant Circuit, Converting R12 to R134a and Servicing", page 71

⇒ "4.1.2 Refrigerant, Keeping Records", page 71

The effects of climate change can be seen worldwide. Protecting the climate is one of the most important responsibilities. However, this responsibility presents enormous challenges to all involved.

The Kyoto Protocol outlines worldwide goals regarding climate protection, among other things. In addition to target reductions of carbon dioxide, this protocol also outlines target reductions for fluorinated greenhouse gases such as refrigerant R134a due to their high global warming potential.

Numerous laws have been created for the automotive industry, for example at the European level. For example, chemical-climate protection regulations were put into effect on 08/01/2008 in Germany in order to define the European legislation in more detail.

- Provision (EU) number 1005/2009
- Provision (EU) number 2037/2000
- Provision (EU) number 842/2006 (from 01/01/2015: EU no. 517/2014)
- Provision (EU) number 706/2007
- Provision (EU) number 307/2008
- Guideline 2006/40/EU
- Chemical-climate protection regulations, recycling and disposal law (for Germany).

Maintenance and repair work on the A/C system refrigerant circuit

All individuals performing maintenance and repair work on vehicle A/C systems must have completed a training program and not be competent in the work required. Other regulations may apply in addition to those of the European Union.

The following general information applies:

Operation, repair, decommissioning, take-back obligation

- When operating, repairing and decommissioning items that contain refrigerant, allowing the refrigerant to vent into the air is prohibited.
- Keep records on the quantities used during operation and maintenance so they can be presented to the authorities upon request. Refer to ⇒ Audi ServiceNet, HSO Environment . A record sheet no longer needs to be kept in the EU due to a provision by the European Parliament in 2005. Oth-

Refrigerant R134a Servicing - Edition 12.2022

er provisions may apply in countries that are not members of the EU.

- Distributors of the substances and preparations discussed above are obligated to accept these items back after use or to ensure they are accepted by a third party of their choosing.
- Maintenance and decommissioning of items containing refrigerant that are named in the legislation Substances and preparations named in this legislation may only be accepted by those with the necessary expertise and technical equipment.

Criminal offenses and infringements of the law

♦ Infringement of the law in regard to the regulations and laws right. Copying for private or commercial purposes, in part or in whole, is not mentioned above. Acting intentionally or negligently durings authorised by AUDI AG. AUDI AG does not guarantee or accept any liability operation, maintenance work, or while taking products out to the correctness of information in this document. Copyright by AUDI AG. of service. Willfully or negligently venting refrigerant into the air when operating, repairing or decommissioning items that contain refrigerant constitutes a violation of the laws and legislation described above.

Observe the various technical regulations for handling and filling compressed gases (for example TRGS 400, TRGS 402, TRGS 407 TRGS 510 TRGS 725 / TRBS3145).



Note

Parts of the Technical Rules for Hazardous Substances (TRGS) are listed (concerning vehicle manufacturers and workshops) below.

- TRGS 400 (hazard assessment for activities with hazardous substances)
- TRGS 402 (determining and evaluating the danger when working with hazardous substances: exposure from inhaling)
- TRGS 407 (activities with gasses hazard assessment)
- TRGS 510 (storage of hazardous substances in transportable canisters)
- TRBS 3145 / TRGS 725 (transportable compressed-gas canisters - filling, keeping ready, internal transportation, emptying)



Note

- ♦ The Technical Rules for Compressed Gases (TRG), Technical Rules for Hazardous Substances (TRGS) and the Technical Rules for Operational Safety (TRBS) describe the state of technology, occupational safety and industrial hygiene as well as other substantiated industrial science knowledge for the provision and use of work equipment such as systems requiring monitoring during use or involving activities with hazardous substances.
- The provided technical rules apply to Germany. Different regulations and laws may apply in other countries.

Observe the various technical regulations for handling and filling compressed gases (for example TRGS 400, TRGS 402, TRGS 407 TRGS 510 TRGS 725 / TRBS3145).

General provisions for charging systems

- Definition of terms and explanatory notes
- Build and operation of charging systems

Charging systems

- Does not apply to vehicle manufacturers or workshops.
- Charging systems are systems for filling mobile compressed-gas canisters. The charging system includes the premises and facilities concerned.
- Charging systems requiring a permit are ones used to transfer compressed gases to mobile compressed-gas canisters for supplying to third parties.
- Charging systems not requiring a permit are ones used for transferring compressed gases to mobile compressed-gas canisters for internal use only.

Employees and employee instruction

- Employees are to be given instruction on the following topics before beginning work and at regular, appropriate intervals, at least once a year
- Hazards specifically associated with handling compressed gases
- The safety precautions, especially TRGS and TRBS.
- Procedures in the event of malfunction, damage and acci-
- The use of fire-extinguishing and protective equipment
- Operation and maintenance of the charging system based on the operating instructions.

Charging systems are only to be operated and maintained by personnel.

- Aged 18 and above
- Possessing the necessary technical knowledge.
- Who can be relied on to work diligently.



Note

Supervised work may also be performed by personnel that do not meet the tequirements stipulated on the guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Filling of pressure canisters (separate technical regulations apply to canisters from other countries and their charging that are not mentioned here).

- A compressed-gas canister may only be filled with the compressed gas declared on it and the quantity must comply with the stipulated pressure, weight or volume data (refer to pressure canister regulations).
- In the case of canisters approved for use with several types of compressed gas, the compressed gas with which it is to be filled and - if the compressed gas has a tc greater than or equal to -10 $^{\circ}$ C (tc = critical temperature) - the maximum permissible charging weight in line with TRGS must be marked on the canister prior to connection for filling.
- Compressed-gas canisters marked with the maximum permissible charge pressure in bar at 15 °C must be filled manometrically. If the temperature is not 15°C (59 °F) at the time of filling, the filling facility must determine the pressure based on the difference in temperature; it must be ensured

that the permissible fill pressure for filling at 15°C (59 °F) is not exceeded in the pressurized canister. The charged canisters are to be checked by way of random pressure measurements to determine possible overfilling.

- Compressed-gas canisters on which the maximum permissible capacity is indicated by the net weight (filling weight, permissible weight of fill) in kilograms, must be filled gravimetrically. The canisters are to be weighed during filling and subsequently subjected to a weight check on special scales to check for possible overfilling. Scales used for this purpose must be calibrated.
- Under certain conditions, gases with a tc greater than or equal to +70 °C may be transferred volumetrically from compressed-gas canisters with a maximum volume of 150 I to compressed-gas canisters with a volume of maximum 1000 ccm. The TRĞS conditions apply to the transfer of liquefied gas to cylinders used by workmen.
- Different TRGS apply to reservoirs in vehicles:
- For gas with to greater than or equal to +70 °C (158 °F).
- For industrial gas mixtures with tc greater than or equal to +70 °C (158 °F).
- Liquefied extremely low-temperature compressed gases may be filled according to volume (volumetrically; reservoirs in vehicles excluded), if the charging system and/or the canisters is/are equipped with devices for measuring or limiting the volume of the charge and for measuring the temperature of the charge. When filling volumetrically, the permissible charge weight indicated on the canister must not be exceeded. To determine possible overfilling, the filled containers are to be checked gravimetrically on a calibrated scale or, provided that the compressed gases are not highly toxic, volumetrically. Volumetric checking requires the use of appropriate equipment. The charging and checking devices must be independent of each other.
- Charging and check measurements are to be performed by different people. Check measurements must be performed immediately upon completion of the filling process.
- Overfilled canisters must be discharged immediately and in a safe manner until the permissible fill is attained. The compressed-gas fill is then to be determined again.
- Specific TRGS 407 parts do not or only partially apply to canisters for liquefied, extremely low-temperature compressed gases which are neither flammable nor toxic; this does not affect the provisions of road traffic legislation.
- When filling compressed gas canisters with liquefied gases at charging temperatures less than or equal to -20 °C (-4 °F), the compressed gas canister (if the canister material has not been tested for temperatures less than or equal to -20 °C (-4 °F)) is not to be released from the charging system for transport until the canister wall temperature is greater than or equal to +20 °C (68 °F).

Recycling and disposal law

Laws and regulations for handling and disposing of refrigerants and refrigerant oils can be found in the chemical-climate protection regulation and in the recycling and disposal law. These are valid in Germany Different laws and regulations may apply in other countries unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Disposal of refrigerant

Refrigerants intended for disposal are to be transferred to marked recycling containers, observing the permissible filling



quantity. For example, refer to the chemical-climate protection regulation and the recycling and disposal law in Germany. Different regulations and laws may apply in other countries.

Disposal of refrigerant oil

Used refrigerant oils from systems employing halogenated hydrocarbons are to be disposed of as waste subject to special supervision. They are not to be mixed with other oils or substances. Proper storage and disposal must be ensured in line with local regulations. For example, refer to the chemical-climate protection regulation and the recycling and disposal law in Germany. Different regulations and laws may apply in other countries. Refer to > Audi ServiceNet, HSO Environment.

4.1.1 Refrigerant Circuit, Converting R12 to R134a and Servicing



Note

- For environmental reasons and on account of the corresponding legislation, refrigerant R12 can no longer be manufactured or supplied. Refrigerant R134a has been developed as a replacement for R12.
- A/C systems developed and designed for R12 refrigerant cannot, however, simply be charged with refrigerant R134a. To ensure trouble-free A/C system function even after conversion, various components of the refrigerant circuit must be replaced.
- An exact description of the conversion procedure and servicing information for converted refrigerant circuits can be found in ⇒ Repair Manual: A/C System with Refrigerant R12 Parts 2 and 3 . (This repair manual is only available in hard copy).

4.1.2 Refrigerant, Keeping Records

The environmental statistics law requires records to be kept on the use of refrigerants.

Consequently, motor vehicle workshops may well have to provide the relevant local authorities with information on their use of refrigerant. It is recommended to always keep a record sheet. Refer to ⇒ Audi ServiceNet, HSO Environment.



Note

- A record sheet no longer needs to be kept in the EU due to a provision by the European Parliament in 2005. A record sheet is currently required when using 50 kg (110.23 lbs) or more in the year (see also Provision (EU) no 1005/2009).
- It is recommended to keep a record sheet because the following the AUDI AG. AUDI AG does not guarantee or accept any liability it is recommended to keep a record sheet because the records of information in this document. Copyright by AUDI AG. authorities can request information regarding refrigerant use starting from a certain amount (currently starting with a use of 20 kg (44.09 lbs) in a year).
- Other provisions may apply in countries that are not members of the EU.

5 Refrigerant Circuit

- ⇒ "5.1 A/C System Repair Information", page 72
- ⇒ "5.2 Refrigerant Circuit, Converting R12 to R134a", page 72
- ⇒ "5.3 A/C Service Station, Using", page 73
- *5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89
- ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93
- ⇒ "5.6 Refrigerant Circuit, Determining Leaks", page 186

5.1 A/C System Repair Information

- cial purposes, in part or in whole, is not A/C systems designed for refrigerant/R12/are only to be guarantee or accept any liability filled with refrigerant R134a if certain requirements are fulfil. Copyright by AUDI AG. led. Refer to Refer to ⇒ "4.1.1 Refrigerant Circuit, Converting Servicing", page 71 and ⇒ Repair Manand S ual: A/C System with R12 Parts 2 and 3. This repair manual is only available in hard copy.
- The refrigerant oils specifically developed for R134a and R12 refrigerant circuits are never to be mixed.
- A/C service stations that come in contact with refrigerant are only to be used for the intended refrigerant.
- Components of R134a refrigerant circuits can be identified by their markings, green labels or design (such as different threads) to prevent interchanging with components designed for refrigerant R12.
- An information label indicating the refrigerant used is provided in the engine compartment on the lock carrier or in the plenum chamber.
- Different refrigerants are never to be mixed.



Note

Pay attention to the information in the chapter when working on the refrigerant circuit. Refer to "Refrigerant Circuit General" Precautions". Refer to ⇒ "2.12 Refrigerant Circuit General Pre-<u>cautions", page 17</u> .

5.2 Refrigerant Circuit, Converting R12 to R134a

CFC refrigerants are no longer used in the automotive industry.

Converting refrigerant circuits from R12 refrigerant to R134a refrigerant and servicing converted circuits.

Refer to ⇒ Repair Manual: A/C System with Refrigerant R12 Parts 2 and 3 (This repair manual is only available in printed form).

5.3 A/C Service Station, Using

- ⇒ "5.3.1 A/C Service Station, Important Usage Information", <u>page 75</u>
- ⇒ "5.3.2 A/C Service Station, Connecting for Measuring and Testing", page 76
- ⇒ "5.3.3 Refrigerant Circuit, Discharging with A/C Service Station", page 77
- ⇒ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80
- ⇒ "5.3.5 Refrigerant Circuit, Charging with A/C Service Station", page 84
- ⇒ "5.3.6 A/C System, Operating after Charging", page 86
- ⇒ "5.3.7 Refrigerant, Transferring to A/C Service Station Storage Canister (Charging Cylinder or Storage Cylinder)", page
- ⇒ "5.3.8 A/C Service Station, Draining", page 88



Caution

- If it is suspected that chemicals (leak stop additives) were added to the refrigerant circuit to seal leaks, do not connect the A/C service station and do not extract the refrigerant.
- Chemicals that seal leaks in the refrigerant circuit (leak stop additives) form deposits that affect the function of the A/C system and lead to malfunctions in the A/C system and the A/C service station.
- ♦ Inform the customer that there are substances in the A/C system that are not approved by Audi and for this reason the A/C system cannot be discharged or serviced.



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- The chemical materials (stop leak additive) for sealing leaks in the refrigerant circuit offered on the market are not approved by Audi AG. There are no permanent-, validity or material compatibility tests. Therefore damage or malfunctions in the A/C system or the A/C service station cannot be exclu-
- The stop leak additives offered on the open market have different physical and chemical properties, which can impair the function of the A/C system and the A/C service station and can even shut down the system completely.
- Audi does not approve the use of chemicals (stop leak additives) to seal leaks in the refrigerant circuit.
- Chemical materials (leak stop additives) to seal leaks in the refrigerant circuit react with air or the moisture in the surrounding air and form deposits in the refrigerant circuit (and in the A/C service station) that lead to malfunctions in the valves and other components that come into contact with such chemicals. These deposits cannot be removed completely from the components (also not through cleaning/flushing with refrigerant R134a).
- It is not possible to recognize chemical substances to seal leaks in the refrigerant circuit (leak stop additives) from the outside and the labels that are supposed to come with them are usually not there. Therefore be careful when working with a vehicle if its service history is unknown.
- The accessories market offers containers used to separate out these chemicals (leak stop additives for sealing leaks in the refrigerant circuit). Since Audi does not know composition and the physical and chemical properties of these materials, it is not possible to make a statement about their effectiveness and the deposition rate of these filters.
- The Filter for Sealants VAS 6592- offers a certain protection for the A/C service station. This filter is incorporated between the A/C service station and the service connection on the low pressure side of the refrigerant circuit in a vehicle (the A/C service station may not be connected to the service connection on the high pressure side of the refrigerant circuit for discharging, evacuating and measuring). This filter separate certain materials that were added to seal leaks in the refrigerant circuit. It prevents these materials from getting into the refrigerant and refrigerant oil in the A/C service station unchecked and causing damage there. For the protection to work, it is necessary that the installed filter be changed in regular intervals and exactly according to the manufacturer specifications (described in the instructions provided). Since Audi does not approve of using chemical materials (stop leak additives) for sealing leaks in the refrigerant circuit and since there are many different compositions of these chemicals (stop leak additives) that are offered as "sealant for refrigerant circuits", it is not possible to make a statement about the effectiveness and efficiency of the Filter for Sealants - VAS 6592- .

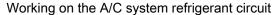
If the refrigerant circuit on a vehicle was filled with a chemical (stop leak additives) to seal any leaks (or if there is suspected) and repairs to the A/C system refrigerant circuit are necessary, inform the customer of the following: AG. AUDI AG does not guarantee or accept any liability

It is not possible to extract the refrigerant from the A/C system due to the stop leak additive that has been added to the system because it will damage the A/C service station. For example, an outside company must be hired to extract the



contaminated refrigerant with a suitable device and then dispose of it (for example, a local waste management company that specializes in disposing of refrigerant).

It will be necessary to replace any refrigerant circuit components that have come in contact with the stop leak additive in order to repair the A/C system properly. Certain refrigerant circuit components may already be damaged by the stop leak additive (for example, the A/C Compressor Regulator Valve - N280-) or will get damaged if they are used over again and will fail after a short amount of time. In addition to this, if there is any stop leak additive deposits still on the refrigerant circuit components, they could come loose at a later point and cause the A/C system to fail again (currently it is not possible to clean these components with any workshop tools).



5.3.1 A/C Service Station, Important Usage Information

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Observe the following with regard to A/C service station operate correctness of information in this document. Copyright by AUDI AG. tion. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).

- The installed filters and dryers must be replaced, at the latest, when the service life specified in the relevant operating instructions has been reached.
- If an A/C service station is also used for cleaning (flushing) the refrigerant circuit, the installed dryer and filter must be replaced in shorter intervals. Refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89.
- Only refrigerant oils that have been approved for the refrigerant circuit in that vehicle may be added (if necessary, fill the refrigerant oil directly into the refrigerant circuit). Refer to the ⇒ Electronic Parts Catalog (ETKA).

Extracted refrigerant is not to be reused if there is any doubt about the composition of the refrigerant extracted, even after cleaning in the A/C service station.

- The A/C service station is to be discharged in these cases (refer to Refer to ⇒ "7 A/C Service Station, Connecting", page 203). The system is cleaned if necessary, and the filters, dryers and refrigerant oil are replaced.
- For example, within Germany, contaminated refrigerant can be returned to the supplier in recycling containers for recycling or for environmentally safe disposal. Other or additional regulations may apply in other countries.

Commercially available A/C service stations can be classified in two groups:

- ♦ A/C service stations that clean extracted vehicle refrigerant for re-use (so-called extraction and recycling stations). For currently available A/C service stations, refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).
- A/C service stations that transfer extracted refrigerant to recycling containers (for large-scale recycling). These are referred to as extraction systems.



5.3.2 A/C Service Station, Connecting for Measuring and Testing

Work procedure may vary depending on the type of tools selected (the tool-specific operating instructions should therefore be followed).



Note

The work procedure is always to be performed as described in the operating instructions for the A/C service station.

The charging hoses are to be connected as follows to prevent the ingress of air or moisture into the refrigerant circuit:

- On vehicles with a high-voltage system, switch off (deactivate) the "auxiliary climate control" function. Refer to the ⇒ Owner's Manual and ⇒ Infotainment/MMI Operating Man-
- Switch off the ignition.
- Connect the A/C service station to the power supply.
- Remove the closure caps from the service connections or connections with a valve. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) by copyright. Copying for private or commercial purposes, in part or in whole, is not
- Evacuate the charging mitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability in the charging middless of information in this document. Copyright by AUDI AG.
- Connect the quick-release coupling to the refrigerant circuit service connection.



WARNING

- Do not open the valves on the low or high-pressure side when the engine is running. Otherwise, the A/C compressor or AVC service station could be destroyed by a short circuit between the high and low-pressure sides of the refrigerant circuit if the A/C system is switched on.
- Only install the hand wheel far enough into the quick-release coupling adapter until the service connection is open. Watch the pressure gauge and do not place too much pressure on the valve.
- Start the engine and perform the planned tests and measurements.
- Compare the determined values with the specified measured values. Refer to Refer to ⇒ "8 Pressures, Checking", page
- Before disconnecting the quick-release coupling, close it by removing the hand wheel.

Vehicles with Only One Service Connection:



Note

Install the A/C Adapter Set - Adapter 9 - V.A.G 1785/9-, A/C Adapter Set - Adapter 10 - V.A.G 1785/10- or A/C Adapter Set - V.A.G 1786- onto the connections with the refrigerant circuit valve and bleed the charging hoses while connecting to the adapters (faintly audible escape of refrigerant gas is permitted). Refer to Refer to ⇒ "7 A/C Service Station, Connecting", page *203* .

 A valve opener must be installed in the charging hose to open the valve in the valve adapter.

Vehicles with High-Voltage System and A/C System Additional Functions (for Example on Audi Q7 e-tron):



Note

For vehicles with the "heat pump" function and/or "high-voltage battery cooling", high pressure is not at the high pressure side service connection in every A/C system operating condition. Depending on the A/C system operating condition, the refrigerant circuit pressure on the high pressure side can only be measured via the pressure / temperature sensor installed in the refrigerant circuit on these vehicles. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

To check the different functions of these A/C systems

- Select the respective function ("cooling the vehicle interior", "heat pump operation" or "cooling the high-voltage battery") using the \Rightarrow Vehicle diagnostic tester and perform it according to the specifications using the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.
- Select and read out the measured values of the different pressure/temperature sensors installed in the refrigerant circuit. Use the > Vehicle diagnostic tester in the "Guided Fault mercial purposes, in part or in whole, is not AG. AUDI AG does not guarantee or accept any liability Finding" function. with respect to the correctness of information in this document. Copyright by AUDI AG.

Refrigerant Circuit, Discharging with 5.3.3 A/C Service Station

- Work procedure may vary depending on the type of tools selected (the tool-specific operating instructions should therefore be followed).
- The refrigerant circuit is to be discharged if parts of the refrigerant circuit are to be removed, if there is any doubt about the quantity of refrigerant in the circuit or if the safety precautions so require.
- All the necessary usage information for working with the refrigerant A/C service station can be found in the A/C service station operating instructions.

Discharging:

On vehicles with a high-voltage system, switch off (deactivate) the "auxiliary climate control" function. Refer to the ⇒ Owner's Manual and ⇒ Infotainment/MMI Operating Manual.

- Switch off the ignition.
- Connect the A/C service station to the vehicle service connections (refer to vehicle-specific refrigerant circuit) according to the operating instructions and start the A/C service station. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair

Also for vehicles with electrically operated valves in the refrigerant circuit that cannot be opened without current (for example the Audi Q7 e-tron):



Note

For vehicles with a high-voltage system and additional A/C system functions ("heat pump operation" or "cooling the highvoltage battery"), valves may be installed in the refrigerant circuit that cannot be opened without current. These valves are opened and closed via stepper motors, for example, and are no longer activated after switching off the ignition. To completely discharge, correctly evacuate and charge the refrigerant circuit, no sections may be closed. Therefore these valves must be opened before performing this work. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

Open the electrically activated valves (not open without current) using the > Vehicle diagnostic tester in the "Guided Fault Finding" function.

ΑII

Discharge the refrigerant circuit using the A/C service station according to the operating instructions.



Caution

There is a risk of damaging the A/C compressor if the refrigerant circuit is empty.

Do not start the engine if the refrigerant circuit is empty.

- Depending on the version of the A/C service station, the refrigerant circuit pressure may be less than 1 bar (14.5 psi) absolute pressure after it has been discharged.
- Depending on the version of the A/C compressor, it may be damaged if it is operated when there is low refrigerant circuit pressure.
- Do not start the engine while the refrigerant circuit pressure is less than the ambient pressure of by AUDI AG. AUDI AG doe

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WARNING

There is a risk of freezing.

Refrigerant may leak out if the refrigerant circuit is not discharged.

Refrigerant must be extracted before opening the refrigerant circuit. If the refrigerant circuit is not opened within 10 minutes of extraction, pressure may form in refrigerant circuit due to evaporation. Extract the refrigerant again.



Note

- There is a possibility of refrigerant oil being extracted from the refrigerant circuit together with the refrigerant. To ensure A/C compressor lubrication, the refrigerant oil in the circuit must be topped up with fresh oil. Refer to Refer to ⇒ "10 Refrigerant R134a Capacities, Refrigerant Oil and Approved or commercial purposes, in part or in whole, is not Refrigerant Oils", page 318 permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability rmation in this document, Copyright by AUDI AG
- ♦ For vehicles with an A/C compressor with no A/C clutch (with an A/C Compressor Regulator Valve - N280-), the engine should not be run for longer than absolutely necessary with the refrigerant circuit empty. Avoid higher engine speeds (A/C compressor always in operation as well).
- For vehicles with an A/C compressor with no A/C clutch, the engine may only be started following complete assembly of the refrigerant circuit (avoid high engine speeds).
- Depending on the A/C compressor version, there may be a valve installed on the high pressure side of the A/C compressor, which prevents the liquid refrigerant from flowing back into the A/C compressor once the A/C system is turned off. If an A/C compressor with this valve is installed in a vehicle with a refrigerant circuit having an expansion valve, then it may take some time until the pressure in the high pressure side decreases (the expansion valve is cold and the pressure in the low pressure side quickly increases after it is turned off, the expansion valve closes and the refriger ant can flow slowly to the low pressure side). If the A/C compressor is switched on (or the refrigerant circuit is evacuated on the low pressure side), the pressure on the low pressure side goes down, the expansion valve opens and the refrigerant can flow to the low pressure side.
- Depending on the version of the A/C service station, the previous operating condition and the ambient temperatures, etc., the amount displayed by the A/C service station for the extracted refrigerant R134a can vary from the actual extracted amount. The amount displayed by the A/C service station for the extracted refrigerant is therefore only a reference point for the amount of refrigerant actually extracted from the refrigerant circuit. Also pay attention to the A/C service station operating instructions and technical product description.

Should work be performed on the vehicle after discharging that does not require using the A/C service station

Disconnect the A/C service station from the refrigerant circuit and turn it off.

Should the refrigerant circuit be evacuated and recharged after the discharging. Refer to Refer to ⇒ "5.3.5 Refrigerant Circuit, Charging with A/C Service Station", page 84



5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station

- The work procedure is always to be performed as described in the operating instructions for the A/C service station.
- The quantity of refrigerant oil in the refrigerant circuit is checked and if necessary corrected. Refer to Refer to ⇒ "10 Refrigerant R134a Capacities, Refrigerant Oil and Approved Refrigerant Oils", page 318.
- The quantity of refrigerant in the A/C service station is checked.

The refrigerant circuit must be evacuated before it is filled with refrigerant (vacuum). Moisture is also extracted from the circuit.

Leaks may be found when evacuating the refrigerant circuit or in whole, is not **Evacuating:** with respect to the correctness of information in this document. Copyright by AUDI AG.



Caution

- Do not start the engine during the evacuation process or when there is a vacuum in the refrigerant circuit.
- The A/C compressor could be damaged if the engine is started when there is a vacuum in the refrigerant circuit.
- Only start the engine when the refrigerant circuit is charged.
- On vehicles with a high-voltage system, switch off (deactivate) the "auxiliary climate control" function. Refer to the ⇒ Owner's Manual and ⇒ Infotainment/MMI Operating Manual.
- Switch off the ignition.
- Connect the A/C service station to the power supply.
- Connect the A/C service station charging hoses to the vehicle refrigerant circuit with the quick-release coupling adapter. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 ; Refrigerant Circuit (vehicle-specific repair manual).
- Install the hand wheel on the quick-release coupling adapter far enough so that the valves in the service connections are securely open. Do not put too much pressure on the valve.



Note

If pressure is to be measured after charging the system on vehicles that only have a service connection on one side of the refrigerant circuit, use the valve adapter and charging hose with valve opener. Refer to Refer to ⇒ "7 A/C Service Station, Connecting", page 203.

Also for vehicles with electrically operated valves in the refrigerant circuit that cannot be opened without current (for example the Audi Q7 e-tron):



- For vehicles with a high-voltage system and additional A/C system functions ("heat pump operation" or "cooling the high-voltage battery"), valves may be installed in the refrigerant circuit that cannot be opened without current. These valves are opened and closed via stepper motors, for example, and are no longer activated after switching off the ignition. To completely discharge, correctly evacuate and charge the refrigerant circuit, no sections may be closed. Therefore these valves must be opened before performing this work. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and use the ⇒ Vehicle diagnostic, tester, in the Gulvate or commercial purposes, in part or in whole, is not ded Fault Finding" function. permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability
- with respect to the correctness of information in this document. Copyright by AUDI AG. The check valves in the refrigerant circuit have a specified residual pressure (approximately 0.1 bar (1.45 psi) or 100 mbar (1.45 psi)) in the flow direction. So that the refrigerant circuit can be completely evacuated (residual pressure less than 5 mbar (0.07 psi)), all electrically activated valves must be opened.
- Open the electrically activated valves (not open without current) using the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

Turn on the A/C service station and evacuate the refrigerant circuit for at least 30 minutes. The pressure indicator must indicate an absolute pressure of less than 10 mbar (0.15 psi) (corresponding to 990 mbar (14.36 psi) vacuum).



Note

At this pressure, both green LEDs light up, for example, on the A/C Service Station V.A.G 1885. For currently available A/C service stations, refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).

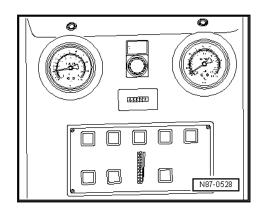
- Turn off the A/C service station and allow it to stand for at least one hour.
- If the vacuum indicator (LED chain) does not change, the system is free of leaks and can be charged.



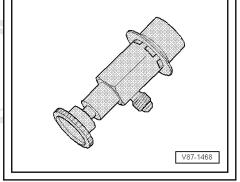
- A current vacuum reading (LED) is only obtained using the A/C Service Station V.A.G 1885, for example, after pressing the Evacuate button again. For currently available service stations, refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).
- On this A/C service station, if the upper (green) LEDs do not illuminate immediately after turning on, either the refrigerant circuit is leaking or there is still residual moisture/refrigerant in the refrigerant circuit.

If the vacuum is not maintained or if a sufficient vacuum cannot be generated, perform the following:

- If the pressure in refrigerant circuit only increases slowly after evacuating, for example, due to evaporating refrigerant from the refrigerant oil:
- If there is any doubt as to whether or not the refrigerant circuit has leaks, evacuate again and monitor the vacuum indicator for a longer period of time. Only when the vacuum is maintained can the refrigerant circuit be charged.
- If it is certain that the refrigerant circuit does not have any leaks, it can be charged.
- If there is a large enough leak that allowed enough air to enter during evacuation that the A/C service station cannot generate a sufficient vacuum or that the vacuum is lost immediately after switching the A/C service station off:
- Determine the location of the leak in the refrigerant circuit as follows:

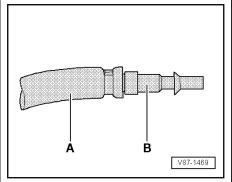






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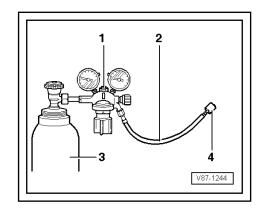


- A large leak can be identified, for example, if a pressure of maximum 15 bar (217.56 psi) can be generated in the refrigerant circuit using clean, dry compressed air or nitrogen. Refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89 . If the leak is large enough, the sound of escaping air or gas can be heard at the location of the leak.
- Add the compressed air or nitrogen to the closed refrigerant circuit through the service connection after fitting it with a quick-release connector adapter.
- The quick-release coupling adapter for service connections can be connected to the workshop compressor unit, for example, using a modified charging hose -A- (for example, with 5/8" 18 UNF threads, depending on the threads on the quick-release coupling adapter) and a suitable adapter -B-. Refer to ⇒ "11.4 Impro ed Tools", page 413 . This keeps the moisture, oil and dirt from the workshop compressor unit from getting into the A/C system refrigerant circuit. Also use a combination fine-mesh filter for compressor units that separates out oil, dirt and water, such as those that are standard in paint shops. Install it between the compressor unit and the charging hose -A-. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heat-
- A compressed gas cylinder filled with nitrogen -3- can be connected to the closed refrigerant circuit using a pressure gauge battery with a pressure reducer for nitrogen (maximum reduction pressure: 15 bar (217.56 psi)) -1- and with a charging hose -2- (for example, with 5/8" 18 UNF threads) connected to the service connection (to which a quick-release coupling adapter for service connections is connected. Refer to Refer to ⇒ "11.3 Commercially Available Tools and Materials", page 411 .
- Slowly increase the pressure in the refrigerant circuit to a maximum of 15 bar (217.56 psi).



WARNING

- Nitrogen can leak uncontrolled from the cylinder.
- Only use pressure reducers for nitrogen cylinders (maximum work pressure 15 bar (217.56 psi)).
- When testing for leaks with nitrogen (maximum permissible pressure 15 bar (217.56 psi)), only work with a pressure reducer for nitrogen cylinders.
- Use appropriate extraction units to draw off the gas mixture escaping from the components.
- Find the location of the leak by listening for the sound of venting gas.
- Repair the leak.
- Evacuate and again monitor the vacuum indicator over a period of hours. Only when the vacuum is maintained can the refrigerant circuit be charged.
- If there is a leak that is small enough that little or no air vents through it and the A/C service station can generate a sufficient vacuum: The vacuum indicator does not increase



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after switching the A/C system service station or only increases very slowly, indicating that air is only entering through a small leak.

- Add 100 grams of refrigerant to the circuit, find the location of the leak using an electronic leak detector and repair it (refer to Refer to ⇒ "5.6.1 Refrigerant Circuit, Tracing Leaks Using Electronic Leak Detector (for example, V.A.G 1796)", page 188) or add UV contrast dye to the refrigerant and find the location of the leak using the Leak Detection System VAS 6201 and repair it (refer to Refer to ⇒ "5.6.2 Leak Detection on Refrigerant Circuit Using Leak Detection System VAS 6201", page 190).
- Discharge the refrigerant circuit, if necessary. Refer to ≥ 5.3.3 Refrigerant Circuit, Discharging with A/C Service Station", page 77
- Evacuate the refrigerant circuit and monitor the vacuum indicator again over several hours. Only when the vacuum is maintained can the refrigerant circuit be charged.

5.3.5 Refrigerant Circuit, Charging with A/C Service Station



Note

The entire refrigerant charge can be added to either the high or low pressure side. Refer to Refer to ⇒ "10 Refrigerant" R134a Capacities, Refrigerant Oil and Approved Refrigerant hole, is not Oils", page 3 ress authorised by AUDI AG. AUDI AG.

- The work procedure is always to be performed as described in the operating instructions for the A/C service station.
- Before adding the refrigerant, correct the quantity of refrigerant oil. Refer to Refer to ⇒ "10 Refrigerant R134a Capacities, Refrigerant Oil and Approved Refrigerant Oils", page
- Make sure that the A/C Service Station is standing at the same level as the vehicle (maximum difference: 50 cm) when charging the refrigerant circuit. If the difference in height is large enough, the displayed and the actual amount of refrigerant added to the circuit may differ, depending on the version of the A/C Service Station . The filling accuracy of the A/C Service Station may change.
- On vehicles with a high-voltage system, switch off (deactivate) the "auxiliary climate control" function. Refer to the ⇒ Owner's Manual and ⇒ Infotainment/MMI Operating Manual.
- Switch off the ignition.
- Evacuate the refrigerant circuit using the A/C service station. Refer to Refer to \Rightarrow "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 .

Also for vehicles with electrically operated valves in the refrigerant circuit that cannot be opened without current (for example the Audi Q7 e-tron):





For vehicles with a high-voltage system and additional A/C system functions ("heat pump operation" or "cooling the highvoltage battery"), valves may be installed in the refrigerant circuit that cannot be opened without current. These valves are opened and closed via stepper motors, for example, and are no longer activated after switching off the ignition. To completely discharge, correctly evacuate and charge the refrigerant circuit, no sections may be closed. Therefore these valves must be opened before performing this work. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

Open the electrically activated valves (not open without current) using the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

ΑII

- Remove the hand wheel at the guick-release coupling adapter (to close it).
- Allow an amount of refrigerant to flow into the charging hose.
- Check the charging cylinder.
- Install the hand wheel at the quick-release coupling adapter (to open it) and charge with the specified quantity of refriger-
- Turn off the A/C service station.

Vehicle that has the discharging and charging of the refrigerant circuit scheduled in the maintenance schedule after a certain operating time

Enter the performed "A/C system re-charged" procedure into the maintenance schedule. Refer to the ⇒ Maintenance Tables and / or "Maintenance" repair manual.



Note

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permitte Discharging and re-charging are only included as maintenance with rwork in the maintenance schedule for certain vehicles (currently for the Audi Q7 e-tron and the Audi A6 e-tron, for example).

Αυδι

5.3.6 A/C System, Operating after Charging



Note

- If the mechanically driven A/C compressor was removed, rotate it approximately 10 times by hand before using it for the first time (during or after installing, for example before installing the belt) to prevent damage caused by liquid impact when first switched on (any oil in A/C compressor cylinder is forced out on rotation).
- If the electronically driven A/C compressor was removed, activate it after charging the A/C compressor via the "Basic setting, compressor cut-in" function for the Guided Fault Finding before switching on the A/C system. Refer to ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for A/C System and Battery Regulation . This prevents the A/C compressor from being damaged, for example, by liquid im-Protpact when it is first switched on (any oil in the A/O compresrision compression chamber is forced our prantee or accept any liat
- The engine drives the mechanically driven A/C compressor via a belt or shaft. The electronically driven A/C compressor is driven via an electric motor attached directly to the A/C compressor (for example on hybrid vehicles).

A/C System, Operating with Mechanically Driven A/C Compressor

- Start the engine with the A/C compressor switched off (version with A/C clutch).
- Set the A/C compressor to minimum output, for example, "Econ" or A/C off mode (version with no A/C clutch with regulator valve).
- Wait until idle speed has stabilized.
- Switch on the A/C compressor and operate the system for at least two minutes at idle speed.
- If necessary, check the pressures in the refrigerant circuit using the A/C service station. $\label{eq:control} % \begin{subarray}{ll} \end{subarray} % \begin{subarray}{ll} \end{suba$
- Turn off the engine.
- Remove the hand wheel on the quick-release coupling adapter.
- Disconnect the charging hoses from the refrigerant circuit.
- Re-install the closure caps.

A/C System, Operating with Electrically Driven A/C Compressor

Operate the A/C compressor using the "Basic setting, compressor cut-in" function in Guided Fault Finding. Refer to .⇒ Vehicle Diagnostic Tester in "Guided Fault Finding" function for A/C System and Battery Regulation .

Also for vehicles with electrically operated valves in the refrigerant circuit that cannot be opened without current (for example the Audi Q7 e-tron):

The Vehicle Diagnostic Tester enables the activation of the electrically activated valves (not open without current) for A/C system operation via the respective control module (to open or close). Use the > Vehicle diagnostic tester in the "Guided Fault Finding" function.



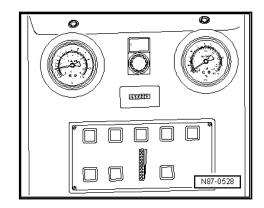
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For vehicles with a high-voltage system and additional A/C system functions ("heat pump operation" or "cooling the high-voltage battery"), valves may be installed in the refrigerant circuit that cannot be opened without current. These valves are opened and closed via stepper motors, for example, and are no longer activated after switching off the ignition. To completely discharge, correctly evacuate and charge the refrigerant circuit, no areas may be closed. Therefore these valves must be opened before these procedures. After completing the work on the refrigerant circuit, use the respective control module to re-activate the triggering of the valves, which are controlled by stepper motors, for example. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual) and use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

ΑII

- After the basic setting and if necessary, check the pressures in the refrigerant circuit using the A/C service station. Refer to Refer to ⇒ "5.3.2 A/C Service Station, Connecting for Measuring and Testing", page 76.
- Remove the hand wheel on the quick-release coupling adapter.



- Disconnect the charging hoses from the refrigerant circuit.
- Re-install the closure caps.

5.3.7 Refrigerant, Transferring to A/C Service Station Storage Canister (Charging Cylinder or Storage Cylinder)

- The work procedure is always to be performed as described in the operating instructions for the A/C service station.
- A certain amount of refrigerant is specified for charging for each A/C system. To ensure that neither too much nor too little refrigerant is added (either would impair the cooling output), the charging cylinder has a scale indicating the weight.
- The volume of a refrigerant changes as a function of pressure. The scale must therefore be set according to the pressure in the charging cylinder.



Note

Do not completely empty the storage canister (charging cylinder or storage cylinder) as the liquid column boundary layer cannot be traced in the tube during filling (outside of the visible range).



WARNING

Do not overfill. A completely filled storage canister (charging cylinder or storage cylinder) will burst when the temperature rises.

5.3.8 A/C Service Station, Draining



Note

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- If it is necessary to drain the A/C service station (for example, due to extraction of contaminated refrigerant), all filters and dryers must always be replaced (do not remove filter and dryer from the air-tight packaging until immediately before installation to minimize moisture absorption).
- Refrigerant cylinders filled with contaminated, used refrigerant are referred to as "Recycling cylinders".
- Always evacuate the recycling cylinders prior to initially filling with refrigerant (if there is air in a refrigerant cylinders, they must not be filled with refrigerant).
- Different types of refrigerant may not be mixed together (refrigerant mixtures cannot be recycled and must be disposed of). If there is any doubt about the composition of the cylinder contents, the refrigerant recycling company is to be informed accordingly.



Caution

- When filling recycling canisters (compressed-gas canisters), observe the existing regulations, technical rules and laws.
- Recycling cylinders are never to be overfilled. Overfilled recycling cylinders do not have a sufficient gas cushion to accommodate the liquid expansion caused by the effects of heat. There is a danger of rupture.
- To ensure safety, only use of recycling cylinders fitted with a safety valve.
- Recycling cylinders must be weighed on calibrated scales during the filling process. The maximum permissi-ble capacity is 75 % (charge factor 0.75) of the charge weight indicated on the recycling cylinder (the possibility of refrigerant oil entering the recycling cylinder along with the refrigerant cannot be ruled out).

5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen

⇒ "5.4.1 Refrigerant Circuit, Blowing Through", page 92

This method is to be used in order to cleanly force out moisture and other contaminants as well as old refrigerant oil from the refrigerant circuit as efficiently as possible, without wasting re-frigerant. In the refrigerant circuit is to be cleaned (flush with refrigerant R134a or blow through with compressed air and nitrogen)



Note

- For the most part, cleaning the refrigerant circuit with compressed air and nitrogen requires significantly more worke, is not than cleaning (flushing) with refrigerant R134a. When clean with ing (flushing) with refrigerant R134a, the components are cleaned better. For this reason, always flush in case of a complaint (blowing through should only be used for certain complaints and individual components).
- Under certain conditions, it may be sufficient to blow through certain components (for example, individual refrigerant lines or refrigerant hoses) with compressed air and nitrogen (for example, for purposes of forcing out old refrigerant oil from individual components that were removed).
- Certain contaminants cannot be removed from the refrigerant circuit with compressed air, or can only be insufficiently removed. These contaminants can be removed, for example by cleaning (flushing) with refrigerant R134a. Refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrig-<u>erant R134a", page 93</u> .
- When blowing through, the maximum work pressure of 15 bar (217.56 psi) must not be exceeded (corresponds to the pressure that is reached in a filled refrigerant circuit at an ambient temperature of approximately 60 °C (140 °F); if necessary, also use the pressure reducer for compressed air)





WARNING

- Nitrogen can leak uncontrolled from the cylinder.
- Only use pressure reducers for nitrogen cylinders (maximum work pressure 15 bar (217.56 psi)).
- Use appropriate extraction units to draw off the gas mixture escaping from the components.
- Always flush or blow through components in opposite refrigerant flow direction.



Note

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The compressed air and nitrogen cannot be blown through the restrictor, expansion valve, A/C compressor and receiver/dryer and reservoir.

For condensers, on which a dryer cartridge is installed in the integrated receiver/dryer, the dryer cartridge must be removed.



Note

- If the receiver/dryer or dryer cartridge is integrated in the condenser, they cannot be replaced separately and the condenser must be replaced after cleaning (flushing).
- Depending on the version, there may be an additional filter element on receiver/dryers where the dryer cartridge can be replaced separately. This filter element must be replaced with the dryer cartridge if necessary.
- First blow out the old refrigerant oil and dirt using compressed air and then use nitrogen to remove moisture from the components.
- Adapter for connecting the pressure hose to the refrigerant circuit. Refer to Refer to ⇒ "7 A/C Service Station, Connecting", page 203 .

Note the following points to prevent the oil and moisture from the compressor unit from entering the refrigerant circuit.

- The compressed air must be routed through a compressed air cleaning device for cleaning and drying. Therefore use the filter and dryer for the compressed air (included in delivery package as a tool for paint work).
- For refrigerant lines with thread or a union nut on the connection, use the adapter from the A/C Adapter Set - V.A.G 1785- (A/C Adapter Set - Adapter 1 - V.A.G 1785/1- through A/C Adapter Set - Adapter 8 - V.A.G 1785/8-) to connect the 5/8" 18 UNF charging hoses (part of this adapter is also found in the Refrigerant Circuits Adapter Set 1 - VAS 6338/1-.
- For refrigerant lines without thread or a union nut on the connection (for connecting adapters), use the adapter from the Refrigerant Circuits Adapter Set 1 - VAS 6338/1- or a commercially available air blow gun with a rubber mouthpiece.



- Only use compressed air and nitrogen to clean the refrigerant circuit if it is not possible to clean (flush) the refrigerant circuit with refrigerant R134a, or the amount of work to flush individual components would be too excessive (for example, a small amount of contaminants and moisture can also be blown out of the refrigerant lines without requiring a lot of time).
- Compressed air or nitrogen coming out of components is to be extracted via an appropriate system (for example, workshop extraction system).

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The refrigerant circuit (or individual components) must be blown through, if there is no option for cleaning (to flush with refrigerant R134a), or cleaning (flushing with refrigerant R134a) is not practical:

- If dirt or other contaminants are located in individual components of the circuit.
- If the vacuum reading is not maintained when evacuating a leak-free refrigerant circuit (pressure build-up due to moisture in the refrigerant circuit).
- The refrigerant circuit has been left open for longer than normal (for example, after a collision).
- Pressure and temperature measurements in the circuit indicate that there is moisture in the refrigerant circuit.
- If there is any uncertainty as to how much refrigerant oil is in the refrigerant circuit.
- The A/C compressor had to be replaced due to internal damage (for example, noise or no output).



Note

For vehicles with an electrically-driven A/C compressor, pay attention to the notes for replacing the Electrical A/C Compressor - V470- (the refrigerant circuit does not always have to be cleaned if there is damage to the A/C compressor electronics). Refer to Refer to ⇒ "9.1.3 A/C Compressor, Replacing without the Need for Flushing Refrigerant Circuit", page 304

If it is stipulated by the vehicle-specific repair manual following the replacement of certain components.



Note

Certain contaminants and old refrigerant oil cannot be removed from the refrigerant circuit with compressed air, or can only be insufficiently removed. These contaminants can be removed, for example by cleaning (flushing) with refrigerant R134a. Refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93 .



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5.4.1 Refrigerant Circuit, Blowing Through



Note

- For vehicles that have refrigerant lines with no threads for connecting the A/C Adapter Set - V.A.G 1785- . Use, for example, an air blow gun with a rubber mouth piece or an adapter from the Refrigerant Circuits Adapter Set 1 -VAS 6338/1- for blowing through the individual components. When using an air blow gun with a rubber mouthpiece, take special care not to damage the connections (bending or scratching).
 - Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not ess authorised by AUDI AG. AUDI AG does not guarantee or accept any liability
- Evaporator is to be blown out via the connection war developed to the correctness of information in this document. Copyright by AUDI AG. pressure line (large diameter) with the expansion valve or restrictor removed.
- Always clean (flush or blow) components in the opposite direction of the refrigerant flow.
- Check the expansion valve and replace if dirty or corroded.
- Locate any components with dark, sticky deposits on them that cannot be removed with compressed air and either clean (flush) the components using refrigerant R134a or replace them.
- Thin, light gray deposits on the inside (of pipes) do not impair the function of the components.
- After blowing through, always replace the receiver/dryer or the reservoir and restrictor. Replace the dryer cartridge on condensers that have one installed in the integrated receiver/dryer.
- For condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately or is not available as a replacement part, the condenser must be replaced after cleaning (flushing). Refer to the ⇒ Electronic Parts
 Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Depending on the version, there may be an additional filter element on receiver/dryers where the dryer cartridge can be replaced separately. This filter element must be replaced with the dryer cartridge if necessary.

After blowing through the refrigerant circuit:

- Replace these vehicle-specific components (restrictor and reservoir, expansion valve and receiver/dryer or dryer cartridge). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).
- Replace the A/C compressor, depending on the complaint (refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual) and ⇒ Electronic Parts Catalog (ETKA)), or drain the rest of the refrigerant oil from the removed A/C compressor (refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacing", page 299; replacing refrigerant circuit components) and fill with the specified amount of new refrigerant oil (refer to Refer to ⇒ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities", page 360; approved refrigerant oils and capacities).



- There is a specific prescribed amount of refrigerant oil in the replacement A/C compressor. If the vehicle has two evaporators, a certain amount of refrigerant oil must also be added to the circuit if necessary. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and Refer to ⇒ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities", page 360 (Approved Refrigerant Oils and Capacities).
- If the A/C compressor is not to be replaced, the quantity of refrigerant oil in the A/C compressor must be topped off according to the prescribed capacity (pour out the refrigerant oil and refill the prescribed quantity into the A/C compressor or refrigerant circuit). Refer to Refer to ⇒ "9 Refrigeran Circuit Components, Replacing", page 299 (replacing refrigerant circuit components) and Refer to ⇒ "10.2 Approved" Refrigerant Oils and Refrigerant Oil Capacities", page 360 (approved refrigerant oils and capacities).
- Completely reassemble the refrigerant circuit again. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Evacuate and fill the refrigerant circuit according to specification. Refer to Refer to ⇒ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ⇒ 5.3.5 Refrigerant Circuit, Charging with A/C Service Sta-

Protected by Start the A/C system according to specification. Refer to permitted in Heating, Ventilation and Air Conditioning, Rep. Gr., 87; with resRefrigerant Circuit; A/C System, Starting Operation after Charging Refrigerant Circuit (vehicle-specific repair manual) and Refer to ⇒ "5.3.6 A/C System, Operating after Charg-<u>ing", page 86</u> .

5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a

⇒ "5.5.1 Main Wiring Diagrams for Various Flushing Circuits", page 105

⇒ "5.5.2 Electrically-Driven A/C Compressor, Flushing (Removing Refrigerant Oil)", page 113

⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118



Caution

- If it is suspected that chemicals to seal leaks (leak stop additive) were added to the refrigerant circuit that is to be flushed, do not connect the A/C service station and do not clean (flush) this refrigerant circuit.
- Chemicals that seal leaks in the refrigerant circuit (leak stop additives) form deposits that affect the function of the A/C system and lead to malfunctions in the A/C system and the A/C service station.
- ♦ Inform the customer that there are substances in the A/C system that are not approved by Audi and for this reason the A/C system cannot be cleaned (flushed) and serviced.



- Audi does not approve the use of chemicals (stop leak additives) to seal leaks in the refrigerant circuit.
- Chemical materials (leak stop additives) to seal leaks in the refrigerant circuit react with air or the moisture in the surrounding air and form deposits in the refrigerant circuit (and in the A/C service station) that lead to malfunctions in the valves and other components that come into contact with such chemicals. These deposits cannot be removed completely from the components, even by cleaning/flushing. It is only possible to service the refrigerant circuit by replacing all the components that have come into contact with this material.
- It is generally not possible to externally recognize chemical substances to seal leaks in the refrigerant circuit (leak stop additive), and the stickers that are supposed to come with them are usually not there. Therefore be careful when working with a vehicle if its service history is unknown.
- The refrigerant circuit must be cleaned by flushing with refrigerant R134a in order to remove moisture, contaminants (such as abraded material from a faulty A/C compressor) as well as old refrigerant oil as cleanly and efficiently as possible, without wasting refrigerant, without the need for extensive assembly work and without endangering the environment.

Flush the refrigerant circuit:

- If dirt or other contaminants are in the circuit.
- If the vacuum reading is not maintained when evacuating a leak-free refrigerant circuit (pressure build-up due to moisture in the refrigerant circuit).
- The refrigerant circuit has been left open for longer than normal (for example, after a collision). e or commercial purposes, in part or in whole, is not
- Pressure and temperature measurements in the circuit indie or accept any liability cate that there is moisture in the refrigerant circuit.
- If there is any uncertainty as to how much refrigerant oil is in the refrigerant circuit.
- The A/C compressor had to be replaced due to internal damage (for example, noise or no output).





- For vehicles with an electrically-driven A/C compressor, pay attention to the notes for replacing the Electrical A/C Compressor - V470- (the refrigerant circuit does not always have to be cleaned if there is damage to the A/C compressor electronics). Refer to Refer to ⇒ "9.1.3 A/C Compressor, Replacing without the Need for Flushing Refrigerant Circuit", page 304 .
- If a faulty A/C compressor is replaced with an A/C compressor from another manufacturer, check if the same refrigerant oil is approved for the A/C compressor to be installed as the one that is already in the refrigerant circuit (from the removed A/C compressor). If a different refrigerant oil is approved for the A/C compressor to be installed than the one in the removed A/C compressor, the refrigerant circuit must be flushed. Refer to Refer to ⇒ "10.2.1 Approved Refrigerant"

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If it is stipulated by the vehicle-specific repair manual following the replacement of certain components.

Required Tools

- ◆ A/C Service Station with Flushing Device (these A/C service) stations have the additional "flush refrigerant circuit" function and are equipped with the refrigerant circuit flushing device required for it). Refer to the ⇒ Electronic Parts Catalog (ET-KA) (Tools; Special Tools and Equipment: A/C and Heating).
- Refrigerant Circuits Adapter Set 1 VAS 6338/1- . Refer to 3 Adapter for Assembling Flushing Circuit", page 118 and the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).



Note

- If an A/C Service Station with Flushing Device is not available (refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating)), a Refrigerant Circuit Flushing Device (refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating)) may also be attached to the refrigerant circuit to flush with refrigerant R134a, depending on the A/C service station version. The procedure must however be performed manually. Refer to ⇒ page 103.
- For vehicles with threaded connections on the refrigerant circuit, the A/C Adapter Set - Adapter 7 - V.A.G 1785/7and A/C Adapter Set - Adapter 8 - V.A.G 1785/8- from the Refrigerant Circuits Adapter Set 1 - VAS 6338/1- can be used; for vehicles with threaded connections on the A/C compressor and reservoir, two A/C Adapter Set - Adapter 8 -V.A.G 1785/8- are required.
- In the Refrigerant Circuits Adapter Set 1 VAS 6338/1-, there is also a Hose - VAS 6338/31- with 5/8" 18 UNF connections and a large inner diameter in the short version (commercially available).

Preliminary Work

Discharge the refrigerant circuit. Refer to ⇒ "5.3.3 Refrigerant Circuit, Discharging with A/C Service Station", page 77. Remove the A/C compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual).

Vehicle with Restrictor and Reservoir

- Remove the restrictor (vehicle-specific) and reconnect the lines to each other. Refer to \Rightarrow Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Remove the reservoir (vehicle-specific) and reconnect the lines to each other (use adapters and the Hose - VAS 6338/31- from the Refrigerant Circuits Adapter Set 1 - VAS 6338/1-). Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118 and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



Note

- Depending on the version, the reservoir could be potentially flushed but it will take too much refrigerant because of its large internal volume; the reservoir would ice-up too much when extracting the refrigerant, the refrigerant would evaporate too slowly and the extraction process would take too
- Depending on the version, the receiver/dryer can be potentially flushed (see vehicle-specific description) but it will take too much refrigerant because of its large internal volume; the receiver/dryer would ice-up too much when extracting the refrigerant, the refrigerant would evaporate too slowly and the extraction process would take too long.

Vehicle with expansion valve and receiver/dryer

Remove the receiver/dryer (vehicle-specific; not necessary on all vehicles) and reconnect the lines to each other (use adapters and the Hose - VAS 6338/31- from the Refrigerant Circuits Adapter Set 1 - VAS 6338/1-). Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118 and ⇒otHeating, Ventilation and Air Conditioning, Rept or in whole, is not Gr. 87mitRefrigerant Gircuit (vehicle-specific repair manual) my liability







- The receiver/dryer can be flushed depending on the version (remove the dryer cartridge installed inside of it if necessary). Refer to Refer to <u>⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118</u> and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- The receiver/dryer attached to the condenser (on the Audi A3 from MY 2004, for example) remains installed during flushing (it can be flushed due to its design and is only replaced after flushing). Refer to Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118 and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- If the receiver/dryer or dryer cartridge is integrated in the condenser, then they cannot be replaced separately or are not available as a single part, and the condenser must be replaced after flushing. In this case, replace the condenser with the receiver/dryer on these vehicles. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- Depending on the version, there may be an additional filter element on receiver/dryers where the dryer cartridge can be replaced separately. This filter element must be replaced with the dryer cartridge if necessary.
- Remove the dryer cartridge on vehicles with a dryer cartridge in the receiver/dryer attached to the condenser (vehicle-specific) and seal off the opening on the receiver/dryer. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Remove the expansion valve (vehicle-specific) and install an adapter from the Refrigerant Circuits Adapter Set 1 - VAS 6338/1- in its place. Refer to ⇒ "5.5.3 Adapter for Asser bling Flushing Circuit", page 118 and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- For vehicles with one or multiple shut-off valves and check valves, remove them and install suitable adapters (or manual shut-off valves) from the Refrigerant Circuits Adapter Set 1 - VAS 6338/1- in their place. Refer to ⇒ "5.5.3 Ada for Assembling Flushing Circuit", page 118 and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



Note

If there is no adapter suitable for the expansion valve in the Refrigerant Circuits Adapter Set 1 - VAS 6338/1-, the removed expansion valve can also be drilled (in most cases, the old expansion valve must also be replaced and is therefore no longer required).

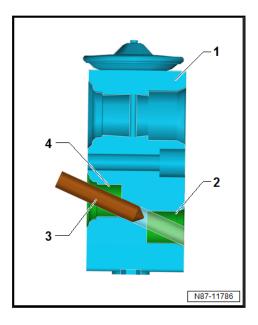
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- Ignore item -3-.
- Make sure when drilling that the flow holes -2- and -4- in the expansion valve -1- are offset to each other.
- If not paying attention while drilling, the sealing surface on the expansion valve -1- could be damaged and then the expansion valve may no longer be used when installing the flushing circuit.

Drill a hole for the expansion valve.



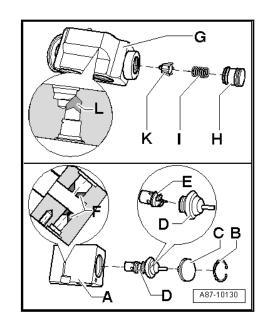


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- Before drilling open, remove the regulating element and drill open the expansion valve using a suitable drill, for example (drill bit diameter 6.0 mm, for example).
- Several components are to be removed from the expansion valve before drilling open.
- Expansion valves are available in various versions and with different constructions. For version -A-, parts -B-, -C- and -D- must be removed, for example. Separate the part -E-(regulating element) from component -D-. Then drill open the expansion valve in area -F- using a suitable drill bit.
- For version -G-, for example, parts -H-, -I- and -K- must be removed and then drill open the area -L- using a suitable drill
- Clean the drilled open expansion valve of residue from the work (shavings).
- Install the parts -B-, -C- and -D- for version -A-, or the part -H- for version -G-.





Note

For vehicles with two evaporators, the circuit to the second evaporator must be disconnected from the circuit of the first evaporator and must be flushed in a separate work procedure. Refer to Refer to ⇒ "5.5.3 Adapter for Assembling I ", page 118 and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 ; Refrigerant Circuit (vehicle-specific repair manual).

Flushing

Check the refrigerant quantity in the A/C service station. There must be at least 6 kg (13.23 lbs) of refrigerant R134a.



Note

If necessary, turn on the heating installed in the A/C service station for the refrigerant cylinder before the first flushing procedure (to increase the pressure in the refrigerant cylinder) and turn it off before the first extraction during the flushing procedure.

- Drain the used oil container of the A/C service station.
- Connect the supply hose (high pressure side) of A/C service station to the low pressure line leading to the A/C compressor (line with larger diameter) using an adapter. Refer to Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit" page 118.
- Connect the return hose (low pressure or intake side) of ss authorised by AUDI AG. AUDI AG does not guarantee or accept any liability the A/C service station to the output of the refrigerant circuit flushing device.
- Connect the input on the refrigerant circuit flushing device to the high pressure line leading to the A/C compressor (line with smaller diameter) using an adapter. Refer to Refer to ≥ <u>'5.5.3 Adapter for Assembling Flushing Circuit", page 118</u> .









- Components are always (with the exception of the electric A/C compressor) flushed in the opposite direction of refrigerant flow when the A/C system is operating. Refer to Refer to ⇒ "5.5.1 Main Wiring Diagrams for Various Flushing Circuits", page 105 .
- While flushing, contaminants from the refrigerant circuit enter the refrigerant circuit flushing device and the A/C service station and are absorbed by the filters and dryers installed there. Depending on the contaminant, these components are to be replaced in shorter intervals in line with operating instructions for A/C service station or refrigerant circuit flushing device.
- Depending on the type and degree of contamination in the flushed refrigerant circuit, the filter in the refrigerant circuit flushing device must be changed after five to ten flushing cycles (flushed vehicles) at the latest. If a heavily contaminated refrigerant circuit is flushed (the refrigerant oil from the circuit is black and viscous or there are many shavings in the refrigerant circuit), the filter should be replaced after flushing this refrigerant circuit. With a refrigerant circuit heavily contaminated in this way, it is wise to flush the refrigerant circuit again after changing the filter.
- Depending on the type of contamination, dirt (old refrigerant oil and abraded material from A/C compressor) accumulates on the viewing glass of the refrigerant circuit flushing device. Clean the viewing glass after flushing if necessary, and flush the refrigerant circuit once more with one flushing procedure as a check (one cycle is sufficient).
- Liquid refrigerant cannot be channeled through the expansion valve, restrictor and desiccant bag of certain receiver/dryers at the necessary speed, therefore these components must be removed and replaced by adapters if necessary. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 ; Refrigerant Circuit (vehicle-specific repair manual).
- Adapters for connecting the A/C service station and for bridging certain refrigerant circuit components. Refer to Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", *page 118* .
- Depending on the refrigerant circuit, assemble the flushing circuit in the vehicle. Refer to Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118.



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Vehicles with Two Evaporators in Refrigerant Circuit:



Note

- The refrigerant circuit is cleaned in two flushing cycles (first the section with the evaporator in the front heater and A/C unit and then the section with the evaporator in the rear heater and A/C unit. Refer to Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118.
- For vehicles with two evaporators, the circuit to the second evaporator must be disconnected from the circuit of the first evaporator and must be flushed in a separate work procedure. Refer to Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118 and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87: Refrigerant Circuit (vehicle commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability specific repair manual). with respect to the correctness of information in this document. Copyright by AUDI AG.

Vehicles with High-Voltage System (without Additional A/C System Functions, for Example the Audi A3 e-tron, Audi Q5 hybrid etc.)



Note

- The refrigerant circuit is cleaned in two flushing cycles (first the section with the evaporator in the front heater and A/C unit and then the section with the high-voltage battery heat exchanger or the evaporator in the battery cooling module). Refer to Refer to ⇒ "5.5.3 Adapter for Assembling Flushing <u>Circuit", page 118</u> .
- For vehicles with two evaporators or an evaporator with a heat exchanger, disconnect the circuit to the second evaporator or to the heat exchanger from the circuit for the first evaporator using the manual shut-off valves and flush it in a separate work procedure. Refer to Refer to ⇒ "5.5.3 Adapter" for Assembling Flushing Circuit", page 118 and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- A flushing cycle currently consists of three flushing procedures one after the other (depending on the program in the respective A/C service station). Refer to ⇒ page 103.
- If necessary, close or open the installed manual shut-off valves depending on which section of the refrigerant circuit should be flushed during this flushing cycle.
- Close or open the installed power-operated valves using the designated routine in the corresponding vehicle control module depending on which section of the refrigerant circuit is to be flushed in this flushing cycle.



Vehicles with High-Voltage System (with Additional A/C System Functions, such as Heat Pump Operation on Audi Q7 e-tron, for Example)



Note

- The refrigerant circuit is cleaned in multiple flushing cycles. Refer to Refer to ⇒ "5.5.3 Adapter for A Circuit", page 118 and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (Cleaning the A/C system refrigerant circuit).
- To flush, the circuit is divided into multiple sections and then cleaned during one flushing cycle at a time. It is divided by activating the installed electrically activated valves and using the installed manual shut-off valves. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (Cleaning the A/C system refrigerant circuit).
- A flushing cycle currently consists of three flushing procedures one after the other (depending on the program in the respective A/C service station). Refer to ⇒ page 103.
- The design of the different flushing circuits for these vehicles is described in the respective vehicle-specific repair manual. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (Cleaning the A/C system refrigerant circuit).
- Close or open the installed manual shut-off valves depending on which section of the refrigerant circuit should be flushed during this flushing cycle. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (Cleaning the A/C system refrigerant circuit).
- Close or open the installed power-operated valves using the designated routine in the corresponding vehicle control module depending on which section of the refrigerant circuit is to be flushed in this flushing cycle. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (Cleaning the A/C system refrigerant circuit).

All Vehicles

Turn on the A/C service station and flush the refrigerant circuit (duration approximately one to one and a half chours at purposes, in part or in whole, is not for one flushing cycle with three flushing operations) PLAG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.





Note

- Perform the flushing procedure according to operating instructions of the A/C service station. Refer to the \Rightarrow A/C Service Station Operating Instructions .
- ♦ Depending on version of A/C service station, the used oil container only holds approximately 125 cm 3 of refrigerant oil. If a system with a larger quantity of refrigerant oil must be flushed, it may be necessary to drain the used oil container after the first flushing procedure of one flushing cycle.
- Observe the refrigerant that flows back into the A/C service station from the refrigerant circuit. Only when the refrigerant streams clear and completely colorless through the viewing glass on the refrigerant circuit flushing device into the A/C service station is the refrigerant circuit cleaned.
- All the refrigerant oil is washed out of the refrigerant circuit during flushing (except for a very small amount in the evaporator, however this can be disregarded).
- If heavily contaminated, it may be necessary to perform the flushing procedure twice (two flushing cycles with three flushing operations each).

Sequence of flushing procedure (sequence occurs automatically according to the A/C service station program)

- After turning on, the flushing circuit (refrigerant circuit with connecting hoses and refrigerant circuit flushing device) is evacuated first and the refrigerant circuit is checked for leaks at the same time. Depending on the A/C service station version, manually switching to advance the program may be required. Refer to the ⇒ A/C Service Station Operating Instructions .
- A prescribed quantity of refrigerant (such as 5 kg (11.02) lbs)) is added to the evacuated refrigerant circuit via the high pressure side of the A/C service station (in the opposite direction of normal flow when A/C system is in operation and also on the low pressure side of the vehicle refrigerant circuit), or, it is filled with so much refrigerant until the refrigerant circuit and viewing glasses on the refrigerant circuit flushing device are completely filled with fluid refrigerant (depending on version of A/C service station, it detects, for example, that refrigerant no longer flows in over a certain time period).
- After the prescribed quantity of refrigerant has been filled, for example, the heater for the refrigerant circuit flushing device is turned on (only if the refrigerant is extracted in its gaseous form from the refrigerant circuit flushing device), depending on version of A/C service station and refrigerant circuit flushing device.
- After the refrigerant has been extracted, the heater on the refrigerant circuit flushing device is switched off (if equipped). Depending on the version, the refrigerant circuit may be briefly evacuated again. After evacuating, the A/C Service Station separates the refrigerant oil extracted from the part or in whole, is not refrigerant circuited unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability
- The sequence of filling refrigerant, extracting (and evacuating) is repeated twice (performed a total of three times). Refer to the ⇒ A/C Service Station Operating Instructions.
- After the third extraction, the flushing circuit is evacuated depending on the version of the A/C service station.

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- After the flushing procedure has ended, check the viewing glass(es) of the refrigerant circuit flushing device. If they are dirty, clean them if necessary according to the operating instructions for the refrigerant circuit flushing device or A/C service station and perform the flushing procedure once more as a test (one cycle is sufficient, duration approximately 30 minutes). Refer to the ⇒ Operating Instructions for the A/C Service Station .
- Check the pressure in the refrigerant circuit; there must be no positive pressure in the refrigerant circuit (evacuate briefly once more if necessary).
- Disconnect the connections to the A/C service station from the vehicle refrigerant circuit (there must be no positive pressure in the refrigerant circuit).
- Replace these vehicle-specific components (restrictor and reservoir, expansion valve and receiver/dryer or dryer cartridge in the receiver/dryer). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA)
- Replace the A/C compressor, depending on the complaint (refer to \Rightarrow Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual) and ⇒ Electronic Parts Catalog (ETKA)), or drain the rest of the refrigerant oil from the removed A/C compressor (refer to Refer to > "9 Refrigerant Circuit Components, Replacing", page 299 replacing refrigerant circuit components) and fill note, is not page 299 replacing refrigerant circuit components) and fill note, is not page 299 replacing refrigerant circuit components) and fill note is not page 299 replacing refrigerant circuit components. with the specified amount of new refrigerant oil (refer to Re DI AG. fer to ⇒ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities", page 360; approved refrigerant oils and capacities).



Note

- There is a specific prescribed amount of refrigerant oil in the replacement A/C compressor. If the vehicle has two evaporators, a certain amount of refrigerant oil must also be added to the circuit if necessary. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and Refer to ⇒ "10.2 Approved" Refrig<u>erant Oils and Refrigerant Oil Capacities", page 360</u> (Approved Refrigerant Oils and Capacities).
- If the A/C compressor is not to be replaced, the quantity of refrigerant oil in the A/C compressor must be topped off according to the prescribed capacity (pour out the refrigerant oil and refill the prescribed quantity into the A/C compressor or refrigerant circuit). Refer to Refer to ⇒ "9 Refrigerant" Circuit Components, Replacing", page 299 (replacing refrigerant circuit components) and Refer to ⇒ "10.2 Approved to 2000 and the circuit components and Refer to 2000 and the circuit components are circuit components and the circuit components are circuit components and circuit components are circuit components are circuit components and circuit components are c Refrigerant Oils and Refrigerant Oil Capacities", page 360 (approved refrigerant oils and capacities).
- Completely reassemble the refrigerant circuit again. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Evacuate and fill the refrigerant circuit according to specification. Refer to Refer to ⇒ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ⇒ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ⇒ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ≥ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ≥ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ≥ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ≥ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ≥ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ≥ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ≥ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ≥ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ≥ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ≥ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ≥ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ≥ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ≥ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station with A/C Service S 5.3.5 Refrigerant Circuit, Charging with A/C Service Station", page 84.
- Start the A/C system according to specification. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit; A/C System, Starting Operation after

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Charging Refrigerant Circuit (vehicle-specific repair manual) and Refer to ⇒ "5.3.6 A/C System, Operating after Charging", page 86

5.5.1 Main Wiring Diagrams for Various Flushing Circuits



Note

- The arrows in the following illustrations show the refrigerant flow direction during flushing (refrigerant flows in the oppo-site direction of flow when A/C system is in operation while flushing, therefore the high pressure side of the A/C service system is connected to the low pressure connection of the refrigerant circuit to the A/C compressor).
- These block diagrams indicate a refrigerant circuit with restrictor and reservoir, and a refrigerant circuit with expansion valve, receiver/dryer and a second evaporator (optional equipment on certain vehicles).
- Depending on the design of the A/C service station, check valves may be installed between the refrigerant circuit and the A/C service station (to guarantee the correct direction of refrigerant flow during flushing).

Flushing Circuit on Vehicles with High Voltage System AG. AUDI AG does not guarantee or accept any liability

Refrigerant Circuit with Restrictor and Reservoir. Refer to > page 105.

Refrigerant Circuit with Expansion Valve, Receiver/Dryer and Second Evaporator. Refer to <u>⇒ page 108</u>.

Vehicles with High-Voltage System (without Additional A/C System Functions, for Example the Audi A3 e-tron, Audi Q5 hybrid etc.). Refer to <u>⇒ page 112</u>.

Vehicles with High-Voltage System (with Additional A/C System Functions, such as Heat Pump Operation on Audi Q7 e-tron, for Example). Refer to ⇒ page 113

Refrigerant Circuit with Restrictor and Reservoir



Note

For vehicles with a restrictor and reservoir, the restrictor and reservoir are removed and the lines that were disconnected to remove the restrictor are reassembled. The line connections to the removed reservoir are connected with each other via two adapters and the Hose - VAS 6338/31- (from the Refrigerant Circuits Adapter Set 1 - VAS 6338/1-).

1 - A/C Service Station

- With electronics and a flushing program, for example A/C Service Station with Flushing Device . Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).
- ☐ If an A/C service station without a flushing program is used, the procedure must be performed manually (evacuate, flush three times with at least 4 kg (8.82 lbs) refrigerant each and extract refrigerant again, evacuate).

2 - A/C Service Station Refrigerant Hose

☐ From the high pressure side of the A/C service station (mostly colored red) to the connection for the low pressure side of the A/C compressor on the refrigerant circuit (larger diameter).

3 - Adapter to Connection for Low Pressure Side on Refrigerant Circuit

There are different versions depending on vehicle. Refer to ⇒
 5.3 Adapter for Asse

<u>"5.5.3 Adapter for Assembling Flushing Circuit", page 118</u>.



4 - Low Pressure Side Connection on Refrigerant Circuit

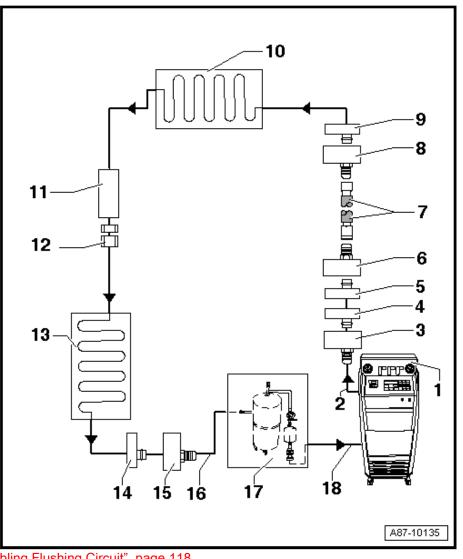
- □ There are different versions depending on vehicle. Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118.
- ☐ On the refrigerant line from the A/C compressor to the reservoir

5 - Connection to Reservoir

- □ There are different versions depending on vehicle. Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118.
- ☐ On the refrigerant line from the A/C compressor to the reservoir

6 - Adapter for Bridging Removed Reservoir

- There are different versions depending on vehicle. Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118.
- ☐ From the Refrigerant Circuits Adapter Set 1 VAS 6338/1-
- 7 Refrigerant Charging Hose. Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118.
 - ☐ For example, Hose VAS 6338/31- (from the Refrigerant Circuits Adapter Set 1 VAS 6338/1-)
- 8 Adapter for Bridging Removed Reservoi Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability
 - ☐ There are different versions depending on vehicle: Refer to <u>★ 15.5.9 Adapter for Assembling Flushing Circuit"</u>, page 118.
 - ☐ From the Refrigerant Circuits Adapter Set 1 VAS 6338/1-



9 - Connection to Reservoir

There are different versions depending on vehicle. Refer to ⇒ "5.5.3 Adapter for Assembling Flushing <u>Circuit", page 118</u> .

10 - Evaporator

11 - Restrictor Component Location

- □ The restrictor is removed.
- Restrictor, Removing. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

12 - Refrigerant Line Threaded Connection

Bolt together again after removing the restrictor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

13 - Condenser

14 - High Pressure Side Connection on Refrigerant Circuit

□ There are different versions depending on vehicle. Refer to ⇒ "5.5.3 Adapter for Assembling Flushing

15 - Adapter to Connection for High Pressure Side on Refrigerant Circuit

- There are different versions depending on vehicle. Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118.
- ☐ From the Refrigerant Circuits Adapter Set 1 VAS 6338/1-

16 - Charging Hose for Refrigerant Circuit Flushing Device

☐ From the connection to the high pressure side of the A/C compressor on the refrigerant circuit (smaller diameter) to the input of the refrigerant circuit flushing device.

17 - Refrigerant Circuit Flushing Device

- ommercial purposes, in part or in whole, is not There are different versions of the Refrigerant Circuit Flushing Device . Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools, Special Tools and Equipment A/C and Heating).
- With filter, viewing glass, safety valve, heater, refrigerant reservoir, etc. (depending on version).
- Depending on the construction of the A/C service station and of refrigerant circuit flushing device, a check-valve may be installed at output of refrigerant circuit flushing device (to guarantee correct direction of refrigerant flow during flushing).
- Depending on the design of the refrigerant circuit flushing device, a connection for a refrigerant circuit service coupling may be located at the outlet (and possibly also at the inlet) of the flushing device (instead of a 5/8-18 UNF external thread). If a service connection with a valve is installed on the outlet of the flushing device, this valve must be all the way open when the service coupling is attached (a partially opened valve creates a constriction). If there is a connection for a service coupling on the inlet of the flushing device, the inlet must be modified so that the refrigerant hose coming from the vehicle can be directly connected (a service coupling and a valve in the flushing device inlet create a constriction that impedes the flow of refrigerant from the vehicle to the flushing device and thus the flushing procedure).



Caution

Risk of icing over the output of the flushing device via the installed valve which is not correctly opened. A partially opened valve installed in this connection creates a constriction that impairs the flow of refrigerant in the flushing device and can ice over due to severe cooling.

l∳there is a service connection with a valve on the outlet of the flushing device, this valve must be all the way open dur-



ing the flushing procedure.

l∳there is too strong of cooling (icing over) at the outlet of the flushing device during the flushing procedure, stop the flushing procedure and evacuate the refrigerant from the flushing device and the vehicle via the high and low pressure side. Check the valve in the outlet of the flushing device and service it if necessary.

Risk of icing on the input of the flushing device due to a constriction which is created via a service coupling and in a service connection installed valve. Remove the service connection installed on this connection, and connect the service hose that comes from the vehicle directly (without constriction) to the flushing device, possibly using a necessary adapter (depending on the inlet thread of the flushing device).

18 - A/C Service Station Refrigerant Hose

☐ From the A/C service station low pressure side (mostly blue) to the outlet of the refrigerant circuit flushing device.

Refrigerant Circuit with Expansion Valve, Receiver/Dryer and Second Evaporator



Note

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not This main wiring diagram shows a refrigerant circuit will to the correctness of information in this document. Copyright by AUDI AG. expansion valve, receiver/dryer and second evaporator (optional equipment on certain vehicles).

- ♦ On vehicles with an expansion valve and receiver/dryer, the expansion valve is removed and replaced by an adapter. Depending on the vehicle, the receiver/dryer must also be removed and line connections to fluid reservoir be connected to each other by two adapters and a charge hose.
- On a vehicle with only one evaporator, components from item "16" are not present or are not needed.

1 - A/C Service Station

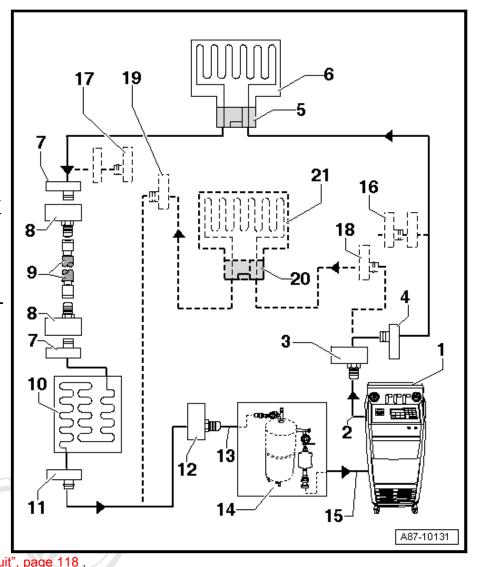
- With electronics and a flushing program, A/C Service Station With Flushing Device . Refer to ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).
- ☐ If an A/C service station without a flushing program is used, the procedure must be per-formed manually (evacuate, flush three times with at least 4 kg (8.82 lbs) refrigerant each and extract refrigerant again, evacuate).

2 - A/C Service Station Refrigerant Hose

From the high pressure side of the A/C service station (mostly colored red) to the connection for the low pressure side of the A/C compressor on the refrigerant circuit (larger diameter).

3 - Adapter to Connection for Low Pressure Side on Refrigerant Circuit

There are different versions depending on vehicle. Refer to = 5.5.3 Adapter for As sembling Flushing Circuit", page 118.



☐ From the Refrigerant Circuits Adapter Set 1 - VAS 6338/1-

4 - Low Pressure Side Connection on Refrigerant Circuit

There are different versions depending on vehicle. Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118.

5 - Adapter for Removed Expansion Valve

- There are different versions depending on vehicle. Refer to

 "5.5.3 Adapter for Assembling Flushing Protected by Control of P permitted unless authorised by Audi Ae. AUDI AG does not guarantee or accept any liabilit
 - with @pecFrom the Refrigerant Circuits Adapter Set 1/AUVAS 6338/1-

6 - Evaporator

7 - Connection to Receiver/Dryer

- There are different versions depending on vehicle. Refer to ⇒ "5.5.3 Adapter for Assembling Flushing
- Not present on vehicles with a dryer cartridge in the receiver/dryer on the condenser or with a receiver/dryer installed in the condenser. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

8 - Adapter for Bridging Removed Receiver/Dryer

- Not required for all vehicles.
- There are different versions depending on vehicle. Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118.
- ☐ From the Refrigerant Circuits Adapter Set 1 VAS 6338/1-

\mathbb{O}	Audi 100 1991 ➤ , Audi 80 1992 ➤ ,	Audi A1 2011 ➤	Audi A1 Sportback 2.
3.	Refrigerant R134a Servicing - Edition	12 2022	

☐ For example, Hose - VAS 6338/31- (from the Refrigerant Circuits Adapter Set 1 - VAS 6338/1-)

10 - Condenser

- ☐ If a receiver/dryer with dryer cartridge is installed on the condenser, the dryer cartridge must be removed (reseal the receiver/dryer at or in the condenser after removing). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- □ If the receiver/dryer is attached directly to the condenser, the receiver/dryer must be removed and replaced only after flushing. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



Note

On certain vehicles the receiver/dryer is integrated inside the condenser and the dryer cartridge cannot be replaced separately and is not available as a single part. In this case, replace the condenser with the receiver/dryer / dryer cartridge after flushing on these vehicles. Refer to > Heating, Ventilation and Air Conditioning; Rep.

Gr. 87; Refrigerant Circuit (vehical by copyright. Copying for private or commercial purposes, in part or in whole, is not cle-specific repair manual) and the unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability ⇒ Electronic Parts Catalog (E√The respect to the correctness of information in this document. Copyright by AUDI AG. KA).

11 - High Pressure Side Connection on Refrigerant Circuit

□ There are different versions depending on vehicle. Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118.

12 - Adapter to Connection for High Pressure Side on Refrigerant Circuit

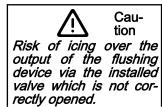
- □ There are different versions depending on vehicle. Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118.
- ☐ From the Refrigerant Circuits Adapter Set 1 VAS 6338/1-

13 - Charging Hose for Refrigerant Circuit Flushing Device

☐ From the connection to the high pressure side of the A/C compressor on the refrigerant circuit (smaller diameter) to the input of the refrigerant circuit flushing device.

14 - Refrigerant Circuit Flushing Device

- ☐ There are different versions of the Refrigerant Circuit Flushing Device . Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).
- With filter, viewing glass, safety valve, heater, refrigerant reservoir, etc. (depending on version).
- □ Depending on the construction of the A/C service station and of refrigerant circuit flushing device, a check-valve may be installed at output of refrigerant circuit flushing device (to guarantee correct direction of refrigerant flow during flushing).
- Depending on the design of the refrigerant circuit flushing device, a connection for a refrigerant circuit service coupling may be located at the outlet (and possibly also at the inlet) of the flushing device (instead of a 5/8-18 UNF external thread). If a service connection with a valve is installed on the outlet of the flushing device, this valve must be all the way open when the service coupling is attached (a partially opened valve creates a constriction). If there is a connection for a service coupling on the inlet of the flushing device, the inlet must be modified so that the refrigerant hose coming from the vehicle can be directly connected (a service coupling and a valve in the flushing device inlet create a constriction that impedes the flow of refrigerant from the vehicle to the flushing device and thus the flushing procedure).



Apartially opened valve installed in this connection creates a constriction that impairs the flow of refrigerant in the flushing device and can ice over due to severe cooling.

I₱there is a service connection with a valve on the outlet of the flushing device, this valve must be all the way open during the flushing procedure.

l₱there is too strong of cooling (icing over) at the outlet of the flushing device during the flushing procedure, stop the flushing procedure and evacuate the refrigerant from the flushing device and the vehicle via the high and low pressure side. Check the valve in the outlet of the flushing device and service it if necessary.

Risk of icing on the input of the flushing device due to a constriction which is created via a service coupling and in a service connection installed valve. Remove the service connection installed on this connection, and connect the service hose that comes from the vehicle directly (without constriction) to the flushing device, possibly using a necessary adapter (depending on the inlet thread of the flushing device).



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15 - A/C Service Station Refrigerant Hose

☐ From the A/C service station low pressure side (mostly blue) to the outlet of the refrigerant circuit flushing device.

16 - Adapter for Sealing Outlet to Second Evaporator

- Only necessary on certain vehicles with optional equipment "second evaporator"
- ☐ From the Refrigerant Circuits Adapter Set 1 VAS 6338/1-

17 - Adapter for Sealing Outlet to Second Evaporator

- Only necessary on certain vehicles with optional equipment "second evaporator"
- ☐ From the Refrigerant Circuits Adapter Set 1 VAS 6338/1-

18 - Low Pressure Side Connection on Refrigerant Circuit to Second Evaporator

There are different versions depending on vehicle. Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118

δυA	Refrigerant R134a Servicing - Edition 12.2022
	Only present on certain vehicles with optional equipment "second evaporator"
19 - H	igh Pressure Side Connection on Refrigerant Circuit to Second Evaporator
	There are different versions depending on the vehicle. Refer to \Rightarrow "5.5.3 Adapter for Assembling Flushing Circuit", page 118.
	Only present on certain vehicles with optional equipment "second evaporator"
20 - A	dapter for Removed Expansion Valve on Second Evaporator
	There are different versions depending on the vehicle. Refer to \Rightarrow "5.5.3 Adapter for Assembling Flushing Circuit", page 118
	Only necessary on certain vehicles with optional equipment "second evaporator"
	From the Refrigerant Circuits Adapter Set 1 - VAS 6338/1-

21 - Second Evaporator

Only present on certain vehicles with optional equipment "second evaporator"

(ŊŊŊ) Audi 100 1991 ➤ , Audi 80 1992 ➤ , Audi A1 2011 ➤ , Audi A1 Sportback 2 ...

Vehicles with High-Voltage System (without Additional A/C System Functions, for Example the Audi A3 e-tron, Audi Q5 hybrid etc.)



Note

- ♦ The refrigerant circuit is cleaned with one or two flushing cycles depending on its design.
- ◆ On vehicles without a high-voltage battery heat exchanger (refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit; System Overview - Refrigerant Circuit) the refrigerant circuit is cleaned with a flushing cycle. Refer to ⇒ page 108.
- ◆ On vehicles with high-voltage battery heat exchanger or battery cooling module evaporator (refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit; System Overview Refrigerant Circuit) the refrigerant circuit is cleaned in the second flushing cycle (first in the step with the evaporator in the front heater and A/C unit and the step with the high-voltage battery heat exchanger or the evaporator in the battery cooling module). Refer to Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118.
- ◆ For vehicles with two evaporators or an evaporator with a heat exchanger, disconnect the circuit to the second evaporator or to the heat exchanger from the circuit for the first purposes, in part or in whole, is not evaporator using the manual shut off valves and flush it is a quarantee or accept any liability separate work procedure. Refer to Refer to ⇒ 5.5.3 Adapter for Assembling Flushing Circuit", page 118 and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- The design of the different flushing circuits for this vehicle is similar to a vehicle with two evaporators. Refer to <u>⇒ page</u> <u>108</u>.



Vehicles with High-Voltage System (with Additional A/C System Functions, such as Heat Pump Operation on Audi Q7 e-tron, for Example)



Note

- The refrigerant circuit is cleaned in multiple flushing cycles. Refer to Refer to ⇒ "5.5.3 Adapter for A Circuit", page 118 and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (Cleaning the A/C system refrigerant circuit).
- To flush, the circuit is divided into multiple sections and then cleaned during one flushing cycle at a time. It is divided by activating the installed electrically activated valves and using the installed manual shut-off valves. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (Cleaning the A/C system refrigerant circuit).
- The design of the different flushing circuits for these vehicles is described in the respective vehicle-specific repair manual. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (Cleaning the A/C system refrigerant circuit).

5.5.2 Electrically-Driven A/C Compressor, Flushing (Removing Refrigerant Oil)

General notes to remove the refrigerant oil from the electrically driven A/C compressor (by flushing).



Note

- Electrically driven A/C compressors cannot have the refrigerant oil poured out in the same manner as a mechanically driven A/C compressor. There is no drain plug and because it is installed inside defending on the version only a specialized part or no refrigerant oil can be poured out. Depending on the version and the storage of the A/C compressor there remains when pouring our approximately 30 to 80 cm 3 refrigerant oil in the A/C compressor (the electrically driven A/C compressor cannot be turned). For this reason, the A/C compressor is to be flushed to remove the refrigerant oil and to determine the amount of refrigerant oil in the A/C compressor, depending on the complaint. Refer to Refer to *⇒ "9.1.3 A/C Compressor, Replacing without the Need for* Flushing Refrigerant Circuit", page 304
- The refrigerant oil can be removed by flushing in the flow direction for electrically driven A/C compressors (because of the installed valve it is not possible to flush against the flow direction).
- Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not To flush, arrange the A/C compressor so that the connection thorised by AUDI AG. AUDI AG does not guarantee or accept any liability for the refrigerant line on the high pressure side is as fow as he correctness of information in this document. Copyright by AUDI AG. possible.
- The electrically driven A/C compressor is to be flushed when, there is dirt, too much refrigerant oil is in the refrigerant circuit, or is contaminated (with moisture debris) and to remove refrigerant oil from the A/C compressor. In these cases the refrigerant circuit must also be flushed, so that it will be cleaned and the correct refrigerant oil quantity for the refrigerant circuit can be set. Refer to Refer to ⇒ "10.2.2 Refrigerant Oil Capacities", page 364





- If the electrically driven A/C compressor is replaced, it is not always necessary to flush the coolant circuit. The amount of refrigerant oil found in the removed A/C compressor can be removed by flushing the A/C compressor. Pour the refrigerant oil out of the new A/C compressor so that only the amount remains (plus 10 cm 3) as before the old A/C compressor was flushed out. Refer to Refer to ⇒ "9.1.3 A/C Compressor, Replacing without the Need for Flushing Refrigerant Circuit", page 304
- To remove the refrigerant oil from the removed A/C compressor the refrigerant oil must be flushed from the replaced A/C compressors and the removed amount measured (Empty the used oil collection from the A/C service station before flushing). Pour the refrigerant oil out of the new A/C compressor so that only the amount or refrigerant oil remains (plus 10 cm³) in the new A/C compressor as the amount of flushed-out-refrigerant-oil from the old-A/Orcompressor whole, is not Dispose of the refrigerant oil removed from the defective and liability the new A/C compressor and poured out refrigerant oil from the new A/C compressor. Refer to ⇒ Audi ServiceNet, HSO Environment (pay attention to local regulations).
- If not enough refrigerant oil can be poured out from the A/C compressor to be installed, flush the new A/C compressor. Fill the A/C compressor to be installed in after flushing with as much new refrigerant oil as was flushed from the removed A/C compressor. Example: 120 cm ³ of refrigerant oil was flushed out of the removed A/C compressor and there is 200 cm³ in the new A/C compressor to be installed (refer to the type plate and Refer to Refer to ⇒ "10.2.2 Refrigerant Oil Capacities", page 364). 110 cm³ (120 cm³ minus 10 cm³) must be poured out of the A/C compressor to be installed so that the amount of refrigerant oil in the refrigerant circuit after installing is correct. If the required amount of refrigerant oil cannot be poured out, flush the A/C compressor to be installed. In the new A/C compressor as much refrigerant oil is to be filled as was flushed out of the old A/C compressor.

Flush the electrically driven A/C compressor.



Note

Depending on the A/C compressor, a larger amount of refrigerant oil (for example, 290 cm³ on an Audi Q7 e-tron) may be filled in a new A/C compressor (refer to the manufacturer label on the A/C compressor and Refer to Refer to ⇒ "10.2.2 Refrigerant" Oil Capacities", page 364). On a new A/C compressor that is filled with more than 100 cm³, pour out as much refrigerant oil as possible before flushing. Reason: depending on the A/C service station version, the oil amount that is deposited/separated in one step may be limited (150 cm³, for example). For additional information, refer to ⇒ Item 5 (page 115).



1 - A/C Service Station

- With electronics and a flushing program, A/C Service Station With Flushing Device . Refer to ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).
- ☐ If an A/C service station without a flushing program is used, the procedure must be per-formed manually (evacuate, flush three times with at least 2 kg (4.41 lbs) refrigerant each and extract refrigerant again, evacuate).

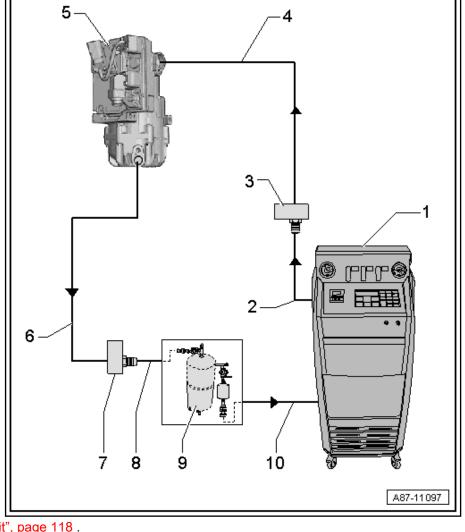
2 - A/C Service Station Refrigerant Hose

□ From the high pressure side of the A/C service station (mostly colored red) to the connection for the low pressure side of the A/C compressor on the refrigerant circuit (larger diameter).

3 - Adapter to the Connection for the Low Pressure Side on the A/C Compressor

There are different versions depending on vehicle. Refer to = 5.5.3 Adapter for Assembling Flushing Circuit", page 118.

☐ Use the adapter from the Refrigerant Circuits Adapter Set 1 - VAS 6338/1- (here the Adapter - VAS 6338/41-).



4 - Refrigerant Line

☐ To the A/C compressor connection on the adapter ⇒ Item 3 (page 115)



- Only use the refrigerant line when the Adapter - VAS 6338/41- is not available.
- If the Adapter VAS 6338/41is not available to remove the flushing circuit, for example remove the refrigerant lines to the condenser, from the vehicle (or use a refrigerant line with the part number 7L6 820 744 AD). Refer to the ⇒ Electronic Parts Catalog (ETKA)).

5 - Electrically-Driven A/C Compressor

The A/C compressor is flushed in the flow direction (from the low pressure side input to the high pressure side output)

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☐ So that as much refrigerant oil as possible is flushed out from the A/C compressor, the A/C compressor must be positioned so that the high pressure side output is as low as possible



Caution

Risk to A/C service station function depending on the version and the amount of refrigerant oil in the A/C compressor Bepending on the A/C service station version, the oil amount that is deposited in one step may be limited (100 cm³, for example). Pay atten-tion to the A/C service station operating instructions and technical product description.

Bepending on the A/C compressor, a larger amount of refrigerant oil (for example, 290 cm³ on an Audi Q7 e-tron) may be filled in a neẃ A/C compressor (refer to Refer to ⇒ "10.2.2 Re- frigerant Oil C <u>page 364</u> and Refer to <u>⇒</u> "9.1.3 A/C Compressor, Replacing without the Need for Flushing Re-<u>frigerant Circuit", page</u> <u>304</u>).

On a new A/C compressor that is filled with more than 150 cm³. pour out as much refrigerant oil as possible (via the high and low pressure connection) into a clean container before flushing. This prevents the A/C service station oil separator from overfilling during the flushing procedure.

When flush the rest of the refrigerant oil out of the A/C compressor.



Note

If the clean refrigerant oil is poured out of a new A/C compressor into a clean container and the A/C compressor is then sealed air-tight, this refrigerant oil can be reused to adjust the amount of refrigerant oil in the circuit.

6 - Refrigerant Line

□ To the A/C compressor connection on the adapter ⇒ Item 7 (page 117)



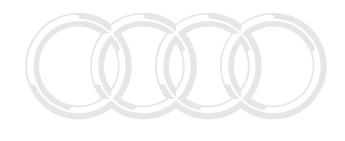
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Note

- Only use the refrigerant line when the Adapter - VAS 6338/40- is not available.
- If the Adapter VAS 6338/40is not available to remove the flushing circuit, use for example, a refrigerant line with the , part number 7L6 820 721 BF or 4G0 260 701 AB. Refer to ⇒ Electronic Parts Catalog (ET-



7 - Adapter to the High Pressure Side Connection on the Refrigerant Circuit

- There are different versions depending on vehicle. Refer to ⇒ "5.5.3 Adapter for Assembling Flushing Circuit", page 118
- Use the adapter from the Refrigerant Circuits Adapter Set 1 VAS 6338/1- (here the Adapter VAS 6338/40-). permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability ct to the correctness of information in this document. Copyright by AUDI AG.

8 - Charging Hose for Refrigerant Circuit Flushing Device

☐ From the connection to the high pressure side of the A/C compressor on the refrigerant circuit (smaller diameter) to the input of the refrigerant circuit flushing device.

9 - Refrigerant Circuit Flushing Device

- There are different versions of the Refrigerant Circuit Flushing Device . Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).
- ☐ With filter, viewing glass, safety valve, heater, refrigerant reservoir, etc. (depending on version).
- ☐ Depending on the construction of the A/C service station and of refrigerant circuit flushing device, a check-valve may be installed at output of refrigerant circuit flushing device (to guarantee correct direction of refrigerant flow during flushing).
- Depending on the design of the refrigerant circuit flushing device, a connection for a refrigerant circuit service coupling may be located at the outlet (and possibly also at the inlet) of the flushing device (instead of a 5/8-18 UNF external thread). If a service connection with a valve is installed on the outlet of the flushing device, this valve must be all the way open when the service coupling is attached (a partially opened valve creates a constriction). If there is a connection for a service coupling on the inlet of the flushing device, the inlet must be modified so that the refrigerant hose coming from the vehicle can be directly connected (a service coupling and a valve in the flushing device inlet create a constriction that impedes the flow of refrigerant from the vehicle to the flushing device and thus the flushing procedure).



Caution

Risk of icing over the output of the flushing device via the installed valve which is not correctly opened.

♦ partially opened valve installed in this connection creates a constriction that impairs the flow of refrigerant in the flushing device and can ice over due to severe cooling.

l∳there is a service connection with a valve on the outlet of the flushing device, this valve must be all the way open during the flushing procedure.

l₱there is too strong of cooling (icing over) at



the outlet of the flushing device during the flushing procedure, stop the flushing procedure and evacuate the refrigerant from the flushing device and the vehicle via the high and low pressure side. Check the valve in the outlet of the flushing device and service it if necessary.

Risk of icing on the input of the flushing device due to a constriction which is created via a service coupling and in a service connection installed valve. Remove the service connection installed on this connection, and connect the service hose that comes from the vehicle directly (without constriction) to the flushing device, possibly using a necessary adapter (depending on the inlet thread of the flushing device).



From the A/C service station low pressure side (mostly blue) to the outlet of the refrigerant circuit flushing device.

Adapter for Assembling Flushing Cirrotected by copyright. Copying for private or commercial purposes, in part or in whole, is not 5.5.3

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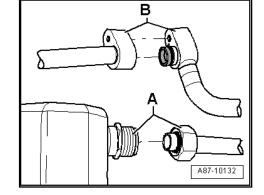
- Various adapters which are required to connect the A/C service station to the refrigerant circuit for flushing and to bridge the removed receiver/dryer or reservoir and expansion valve (specific to vehicle) are in the following table.
- Using a charge hose with 5/8 -18 UNF connections (short version, for example Refrigerant Circuits Adapter Set 1 -Adapter 31 - VAS 6338/31-), connect the two adapters (contained in Refrigerant Circuits Adapter Set 1 - VAS 6338/1-) which have been installed for the removed reservoir or receiver/dryer.
- If a flushed refrigerant circuit is not reassembled immediately after flushing, leave the adapters on the connections and seal the connections on the adapters using Refrigerant Circuits Adapter Set 1 - Adapter 30 - VAS 6338/30- (from Refrigerant Circuits Adapter Set 1 - VAS 6338/1-).
- Depending on the A/C compressor version and the date of manufacture, different connection and sealing techniques can be found on the refrigerant circuit. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".



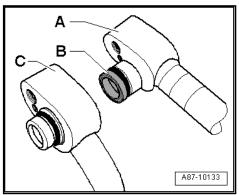
Block or screw connections

- Threaded connection -A-
- Block connection -B-

Block connections with different types of seals



- Block connection with radially sealed connection -A- (with plastic or metal guide -B-)
- Block connection with axial sealing connection -C-



Assembling the flushing circuit	
Audi A1 (8X_) and Audi A2	⇒ page 120
etAudicAfri(GBp) ing for private or commercial purposes, in part or in whole, i	⇒'page 122
ri Audi Q2peAudi (A3, Audi Q3 and Audi TTCopyright by AUDI AG	⇒ page 122
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Audi 100, Audi A6 (4A_, 4B_ and 4F_), Audi allroad and Audi V8	⇒ page 148
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Audi A1 (8X_) from MY 2011 and Audi A2

Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiv- er/dryer	Miscella- neous
Audi A1 (8X_) from MY 2011	 Compressor manufacturer "Denso", "Sanden" or "Delphi/ Mahle" Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- High pressure side Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3- or Refrigerant Circuits Adapter Set 1 - Adapter Set 1 - Adapter 2 - VAS 6338/2- (depending on the version of the A/C compressor and its refrigerant line). 	Different versions Version 1 (the receiver/dryer is integrated on the condenser): the adapter is not needed, the desiccant bag is removed from the receiver/dryer on the condenser and opening is closed again for flushing. Version 2 (receiver/dryer attached to the condenser): the adapter is not needed, the receiver/dryer remains installed (it will be replaced after flushing)	The expansion valve is removed and the Refrigerant Circuits Adapter Set 1 - Adapter 34 - VAS 6338/34- or Refrigerant Circuits Adapter Set 1 - Adapter 39 - VAS 6338/39- (see the note below) is installed (or the removed expansion valve is drilled for flushing and installed again). Refer to ⇒ page 97 .



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Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiv- er/dryer	Miscella- neous
Audi A2 (8Z_) from MY 2001	 Compressor manufacturer "Denso" Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter Set 1 - Adapter 2 - VAS 6338/2- 	Reservoir Threaded connection at input Refrigerant Circuits Adapter Set 1 - Adapter 9 - VAS 6338/9 Block connection with axial sealing at output Refrigerant Circuits Adapter Set 1 - Adapter 10 - VAS 6338/10	- Restrictor removed, connec- tions re- connected

- The receiver/dryer may be attached to or integrated in the condenser on the Audi A1 / S1, depending on the version of the condenser. A dryer cartridge is installed in the integrated receiver/dryer and can be replaced separately. An attached receiver/dryer (introduction TBD) must be replaced after the flushing. Refer to the ⇒ Electronic Parts Catalog (ET-KA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- There are different versions of the A/C unit (different heater core and sears different expansion valve etc.) depending on time period of production and from the VIN number on Audi A1 / S1. Refer to the ⇒ Electronic Parts Catalog (ETKA) . Vehicles with the type keys "8X1" and "8XA" in the VIN have an expansion valve installed, where both refrigerant lines are attached at the top. This is where the Refrigerant Circuits Adapter Set 1 - Adapter 34 - VAS 6338/34- fits. Vehicles with the type keys "8XF" and "8XK" in the VIN have an expansion valve installed, where both refrigerant lines are attached from below. This is where the Refrigerant Circuits Adapter Set 1 - Adapter 39 - VAS 6338/39- fits. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

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Audi Q2, Audi A3, Audi Q3, Audi TT and Audi A1 (GB_) from MY 2019

Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiv- er/dryer	Miscella- neous
Audi A3 (8L_) from MY 1997 Audi TT (8N_) from MY 1999	 Compressor manufacturer "Sanden" or "Zexel / Valeo" Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 7 - VAS 6338/7- High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 2 - VAS 6338/2- 	Receiver/Dryer - Block connections with axial sealing at input and output Refrigerant Circuits Adapter Set 1 - Adapter 2 - VAS 6338/2- (necessary two times).	Expansion valve removed and Refrigerant Circuits Adapter Set 1 - Adapter 19 - VAS 6338/19-installed (or drilled expansion valve, for example 6N0 820 679 C installed, refer to ⇒ page 97).
Audi A3 (8P_) from MY 2004 Audi TT (8J_) from MY 2007 Audi Q3 (8U_/ 84_) from MY 2012	 Compressor manufacturer for the Audi A3 / Audi Q3: "Sanden", "Denso", "Delphi/ Mahle" or "Zexel / Valeo" Compressor manufacturer for the Audi TT: "Denso", "Sanden" or "Delphi/ Mahle" Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3 	Receiver/dryer (different versions) No adapter needed, the receiver/dryer remains installed Depending on the condenser version, remove the dryer cartridge from the receiver/dryer on the condenser before flushing and then seal the opening again (see note).	Expansion valve removed and Refrigerant Circuits Adapter Set 1 - Adapter 18 - VAS 6338/18-installed (or drilled expansion valve, for example 1K0 820 679 installed). Refer to ⇒ page 97 .

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Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiver/dryer	Miscella- neous	
Audi Q2 (GA_), Audi A3 (8V_/ 85_) from MY 2013 Audi TT (FV_) from MY 2015 Audi Q2 (G1_) from MY 2019 Audi Q3 (F3_/ G2_) from MY 2019 Audi A1 (GB) from MY 2019 Audi A1 (GB) from MY 2019 Audi A1 (GB) from MY 2019 Audi A3 (8Y_)/ 88_) from MY 2019, Audi A3 (8Y_)/ 88_)	permitted unless authorise	Receiver/dryer (different versions) No adapter necessary, the receiver/dryer remains installed (or is integrated in the condenser). Depending on the condenser version, remove the dryer cartridge from the receiver/dryer on the condenser before flushing and then seal the opening again (see note).	uarantee or accept	any liability

Note

- Depending on the condenser manufacturer, the receiver/dryer version is different. An Audi TT (8J_) from MY 2007 with a 5-cylinder engine has a different condenser version than on models with a 4- or 6-cylinder engine. The receiver/dryer is, for example, inside the condenser. The integrated receiver/dryer has a dryer cartridge that is no longer available as a replacement part. If there is a complaint regarding a vehicle with this condenser, it may be necessary to replace the entire condenser after correcting the complaint. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately or is not available as a replacement part, the condenser must be replaced after flushing (with the dryer cartridge installed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).



Audi Q2L e-tron (GAG) from MY 2019

Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiv- er/dryer	Miscella- neous
Audi Q2L e- tron (GAG) from MY 2019	 Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- ◆ High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3- 	Remove the dry- er cartridge before flushing out of the receiver/dryer on the condenser and reseal the opening refer to the notes).	◆ Expansion valve remove and installed with the Refrigerant Circuits - Adapter 38 - VAS 6338/38 (or a drilled open expansion valve, refer to ⇒ page 97 .)



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Required adapter / lines for the connections to the electrically driven A/C compressor (to flush the A/C compressor) (refer to ⇒ page 114) (flushing the electrically-driven A/C compressor). Protected by copyright. Copying for private or commercial purposes, in part or in wholation). Protected by copyright. Copying for private or commercial purposes, in part or in wholation). Protected by copyright. Copying for private or commercial purposes, in part or in wholation). Protected by copyright. Copying for private or commercial purposes, in part or in wholation). Protected by copyright. Copying for private or commercial purposes, in part or in wholation). Protected by copyright. Copying for private or commercial purposes, in part or in wholation). Protected by copyright. Copying for private or commercial purposes, in part or in wholation). Protected by copyright. Copying for private or commercial purposes, in part or in wholation). Protected by copyright. Copying for private or commercial purposes, in part or in wholation). Protected by copyright. Copying for private or commercial purposes, in part or in wholation). Protected by copyright. Copying for private or commercial purposes, in part or in wholation). Protected by copyright. Copying for private or commercial purposes, in part or in wholation). Protected by copyright. Copying for private or commercial purposes, in part or in wholation). Protected by copyright. Copying for private or commercial purposes, in part or in wholation). Protected by copyright. Copying for private or commercial purposes, in part or in wholation.
so that the connection for the refrigerant line on the high pressure side is as low as possible.



Note

After flushing the dryer cartridge in the receiver/dryer on the condenser must be replaced. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit.



Audi Q4 e-tron, China (G3B) from MY 2022

Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiver/dryer	Miscella- neous	
Audi Q4 e-tron, China (G3B) from MY 2022	 Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- ◆ High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3- 	Receiver/dryer (different versions) No adapter necessary, the receiver/dryer remains installed (or is integrated in the condenser). Remove the dryer cartridge before flushing out of the receiver/dryer on the condenser and reseal the opening refer to the notes).		opyright. Copying for private or commercial purposes, in part or in whole, is not ss authorised by AUDI AG. AUDI AG does not guarantee or accept any liability it to the correctness of information in this document. Copyright by AUDI AG.



Note

Condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately or is not available as a replacement part, the condenser must be replaced after flushing (with the dryer cartridge installed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKÁ).

Audi A3 e-tron



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Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiver/dryer	Miscella- neous	
Audi A3 (8V_/ 85_) from 2013	- Compressor manufacturer: "Denso" or "Sanden", Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3-	Receiver/dryer (different versions) No adapter necessary, the receiver/dryer remains installed (or is integrated in the condenser). Depending on the condenser version, remove the dryer cartridge from the receiver/dryer on the condenser before flushing and then seal the opening again (see note). Refrigerant Circuits Adapter Set - Shut-Off Valve - VAS 6338/42-	◆ Expansion valve removed and Refrigerant CAS 6338/38 installed • Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve Heater Core Refriger and A/C High-Voltage Battery Heater Core Refriger ant Shut-Off Valve Heater Core Refriger and A/C Unit Refrigerant Shut-Off Valve Heater Core Refriger and A/C Unit Refrigerant Shut-Off Valve Heater A/C Unit Refrigerant Shut-Of	JDI AG.



Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiver/dryer	Miscella- neous	
			Unit Refrigerant Shut-Off Valve - N541- and High- Voltage Battery Heater Core Refrigerant Shut-Off Valve High- Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542- after	
			flushing. The restrictor in the refrigerant line to the high-voltage battery heat exchanger is removed or the refrigerant line is drilled (refer to the notes below). Replace after flushing.	

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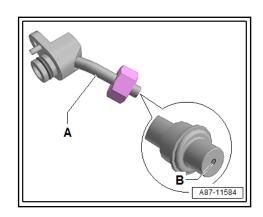


Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiver/dryer	Miscella- neous	
	Required adapter / lines for the connections to the electrically driven A/C compressor (to flush the A/C compressor) (refer to ⇒ page 114) (flushing the electrically-driven A/C compressor).		The refrigerant oil is removed by flushing in the flow direction for electrically-driven A/C compressors (because of the installed valve it is not possible to flush against the flow direction).	
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Note

- For this vehicle the refrigerant circuit is flushed by diving it into two sections. In the first flushing cycle, the adapter, which is installed for the Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541- , is opened and the adapter, which is installed for the High-Voltage Battery Heater Core Refrigerant Shut-Off Valve High-Voltage Battery Heater Core Refriger-ant Shut-Off Valve - N542- is closed. Thus the refrigerant circuit with the evaporator in the A/C unit is flushed. In the second flushing cycle, the adapter, which is installed for the Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541- , is closed and the adapter, which is installed for the High-Voltage Battery Heater Core Refrigerant Shut-Off Valve High-Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542- is opened. The refrigerant circuit with the evaporator in the high-voltage battery heat exchanger is flushed as a result. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- This illustration shows a refrigerant line -A- with a permanently installed restrictor -B- (without screen) This refrigerant line is drilled with a suitable drill 5.0 mm to flush the refrigerant circuit (an inserted restrictor is removed) and cleaned in the flushing circuit before installing. The refrigerant line or an inserted restrictor must be replaced after flushing. Refer to ⇒ Electronic Parts Catalog (ETKA) .
- The diameter of the illustrated restrictor hole -B- is approximately 0.7 mm. Depending on the version of the refrigerant line, this constriction is either permanently installed in the refrigerant line or is only inserted. A screen to separate floating deposits may be installed on the inserted version, which can block the restrictor hole.
- The version of the receiver/dryer on the Audi A3 will differ depending on the manufacturer of the condenser. The receiver/dryer is, for example, inside the condenser. The integrated receiver/dryer has a dryer cartridge that is no longer available as a replacement part. If there is a complaint regarding a vehicle with this condenser, it may be necessary to replace the entire condenser after correcting the complaint. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately on is not available ses, in part or in whole, is not as a replacement part the condenser must be replaced or guarantee or accept any liability after flushing (with the dryer carringe installed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Ŕep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).



Audi A3 TFSIe (8Y_) from MY 2021, Audi Q3 TFSIe (F3_) from MY 2021



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Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiver/dryer	Miscella- neous
Audi A3 TFSIe (8Y_) from MY 2021, Audi Q3 TFSIe (F3_) from MY 2021	- Compressor manufacturer "Hanon" ◆ Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- ◆ High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3- Protected by copyright. C permitted unless authoris with respect to the cor	Receiver/dryer (different versions) No adapter necessary, the receiver/dryer remains installed (or is integrated in the condenser). Depending on the condenser version, remove the dryer cartridge from the receiver/dryer on the condenser before flushing and then seal the opening again (see note). Refrigerant Circuits Adapter Set - Shut-Off Valve - VAS 6338/42-pying for private or commercial pured by AUDI AG. AUDI AG does not extress of information in this document.	◆ Expansion valve removed and Refrigerant Circuits Adapter - VAS 6338/38- installed ◆ Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off valve Heater and High- Voltage Battery Heater Core Refriger- ant Shut-Off Valve High- Voltage Battery Heater Core Refriger- ant Shut-Off Valve High- Voltage Battery Heater Core Refriger- ant Shut-Off Valve High- Voltage Battery Heater Core Refriger- ant Shut-Off Valve High- Voltage Battery Heater Core Refriger- ant Shut-Off Valve High- Voltage Battery Heater Core Refriger- ant Shut-Off Valve High- Voltage Battery Heater Core Refriger- ant Shut-Off Valve Hotes Heater and A/C Unit Re- frigerant Shut-Off Valve Heater and A/C

Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiver/dryer	Miscella- neous	
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Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiver/dryer	Miscella- neous
	permitted unless aut	t. Copying for private or commercial norised by AUDI AG. AUDI AG does correctness of information in this do	The refrigerant oil is removed by flushing in the flow direction for electrically-driven A/C purpocompart or in whole, is not not gipress or accept any liability curve or \$\infty\$ (beht by AUDI AG. cause of the installed valve it is not possible to flush against the flow direction).
			◆ To flush, arrange the A/C com- pressor so that the con- nection for the refrig- erant line on the high pres- sure side is as low as pos- sible.



Note

- For this vehicle the refrigerant circuit is flushed by diving it into two sections. In the first flushing cycle, the adapter, which is installed for the Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541- , is opened and the adapter, which is installed for the High-Voltage Battery Heater Core Refrigerant Shut-Off Valve High-Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542- is closed. Thus the refrigerant circuit with the evaporator in the A/C unit is flushed. In the second flushing cycle, the adapter, which is installed for the Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541- , is closed and the adapter, which is installed for the High-Voltage Bat-n part or in whole, is not tery Heater Core Refrigerant Shut-Off Valve High Voltage antee or accept any liability Battery Heater Core Refrigerant Shut-Off Valve - N542- is opyright by AUDI AG opened. The refrigerant circuit with the evaporator in the high-voltage battery heat exchanger is flushed as a result. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- ◆ The Heater and A/C Unit Refrigerant Shut-Off Valve N541and the High-Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542- must be replaced after flushing.
- ◆ This illustration shows a refrigerant line -A- with a permanently installed restrictor -B- (without screen) This refrigerant line is drilled with a suitable drill 5.0 mm to flush the refrigerant circuit (an inserted restrictor is removed) and cleaned in the flushing circuit before installing. The refrigerant line or an inserted restrictor must be replaced after flushing. Refer to ⇒ Electronic Parts Catalog (ETKA).
- ♦ The diameter of the illustrated restrictor hole -B- is approximately 0.7 mm. Depending on the version of the refrigerant line, this constriction is either permanently installed in the refrigerant line or is only inserted. A screen to separate floating deposits may be installed on the inserted version, which can block the restrictor hole.
- ◆ Condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately or is not available as a replacement part, the condenser must be replaced after flushing (with the dryer cartridge installed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).



Audi 80, Audi 90, Audi Coupe, Audi Cabriolet and Audi A4

Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiver/dryer	Miscella- neous	
Audi 80 (8A_/ 8C_), Audi Coupe (8B_), Audi Cabrio- let (8G_) through MY	 Compressor manufacturer "Zexel / Valeo" (threaded connections) Low pressure side A/C Adapter Set Adapter 8 - VAG 1785/8- 	Reservoir with different connection versions ◆ Version "1" - Threaded connection at input Refrigerant Circuits Adapter Set 1 - Adapter 9 - VAS 6338/9	- Restrictor removed, connec- tions re- connected	
2002 Audi A4 (8D_) from MY 1995	 ◆ High pressure side A/C Adapter Set - Adapter 7 - VAS 1785/7- 	 Threaded connection at output A/C Adapter Set - Adapter 8 - VAG 1785/8- 		
	- Compressor manufacturer "Denso" (block connections with radial and axial sealing) ◆ Low pressure side: Refriger erant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- ◆ High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 2 - VAS 6338/2-	→ Version "2" - Threaded connection at input Refrigerant Circuits Adapter Set 1 - Adapter 9 - VAS 6338/9 - Vright Block connection at output Refrigerant Circuits Adapter Set 1 - Adapter Set 1 - Adapter 10 - VAS 6338/10	loes not guarantee	part or in whole, is not or accept any liability right by AUDI AG.

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Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiv- er/dryer	Miscella- neous	
Audi A4 (8E_) from MY 2001 Audi A4 Cabrio- let (8H_) from MY 2003	 Compressor manufacturer "Denso" (block connections with radial and axial sealing) Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- 	Reservoir with different connection versions ◆ Version "1" - Block connections with axial sealing at input and output ◆ Refrigerant Circuits Adapter Set 1 - Adapter 10 - VAS 6338/10- (necessary two times)	- Restrictor removed, connec- tions re- connected	
	 ✦ High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 2 - VAS 6338/2- 			opyright. Copying for private or commercial purposes, in part or in who
	- Compressor manufacturer "Denso" (block connections with radial seal). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). ◆ Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12-			t to the correctness of information in this document. Copyright by AUD
	◆ High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3-			

6338/3-



ehicle Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiver/dryer	Miscella- neous
udi A4 iK_) om Y 008 Low pressure side: Refrig- erant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- High pres- sure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3-	Receiver/dryer (different versions) No adapter needed, the receiver/dryer remains installed Depending on the condenser version of the dryered cartridge from the receiver/dryer on the condenser before flushing and then seal the opening again (see note).	Expansion valve removed and Refrigerant Circuits Adapter Set 1 - Adapter 36 Adapter 37 Adapter 36 Adapter 37 A



Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiv- er/dryer	Miscella- neous
Audi A4 (8W_) from MY 2016 Audi A4 (86_) from MY 2017	 Compressor manufacturer: "Denso" or "Sanden" Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3- 	No adapter required, dryer is removed from receiver/dryer on condenser and the opening is sealed.	The expansion valve is removed and Refrigerant Circuits Adapter Set 1 - Adapter 44 - VAS 6338/44-is installed (or an old expansion valve is drilled on and installed as an adapter). Refer to ⇒ page 97 and the ⇒ Electronic Parts Catalog (ET-KA) .

- Depending on the condenser manufacturer, the receiver/dryer version for the Audi A4 (8K_) from MY 2008 varies. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). The receiver/dryer may be attached to or integrated in the condenser, depending on the version of the condenser. The integrated receiver/dryer has a dryer cartridge that is no longer available as a replacement part. In the event there is a complaint on a vehicle with this condenser, the condenser must be completely replaced. Refer to the ⇒ Electronic Parts Catalog (ETKA).
- Condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately or is not available as a replacement part, the condenser must be replaced after flushing (with the dryer cartridge installed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87, Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).







Audi A5 Coupe and Sportback, Audi Q5, Audi A5 Cabriolet

ers fo	uired adapt- or the con- ons to A/C pressor	Required adapters for the connections to re- ceiver/dryer	Miscella- neous
oupe m "I port- ack si BT_) om IY 008 .udi Q5 BR_ / 3_) om IY 008 .udi A5 cabrio- at (8F)	ompressor nanufacturer Denso" ow pressure de: Refrig-rant Circuits dapter Set - Adapter 2 - VAS 338/12- pressure side: et in cuits dapter Set - Adapter 3 VAS 338/3-	Receiver/dryer (different versions) No adapter needed, the receiver/dryer remains installed Depending on the condenser version, remove the dryer cartridge from the condenser being fore flushing and then seal the opening again (see note).	Expansion valve removed and Refrigerant Circuits Adapter Set 1 - Adapter 36 - VAS 6338/36 for example 8K0 820 679 A installed expansion valve, for example 8K0 820 679 A installed). Refer to ⇒ page 97 . The refrigerant line with the inner heat exchanger remains installed or will be installed or will be installed after installing the adapter.

Vehicle	Required adapters for the connections to A/C compressor	Required adapters for the connections to re- ceiver/dryer	Miscella- neous
Audi As (F5_) from MY 2016 Audi Qs (FY_) from MY 2017 Audi Qs (87_) 2019	manufactur- er: "Denso" or "Sanden" ◆ Low pressure side: Refrig- erant Circuits Adapter Set 1 - Adapter 12 - VAS	No adapter required, dryer is removed from receiver/dryer on condenser and the opening is sealed.	The expansion valve is removed and Refrigerant Circuits Adapter Set 1 - Adapter 44 - VAS 6338/44-is installed (or an old expansion valve is drilled on and installed as an adapter). Refer to ⇒ page 97 and the ⇒ Electronic Parts Catalog (ET-KA) .

- Depending on the condenser manufacturer, the receiver/dryer version for these vehicles varies. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). The receiver/dryer may be attached to or integrated in the condenser, depending on the version of the condenser. The integrated receiver/dryer has a dryer cartridge that is no longer available as a replacement part. In the event there is a complaint on a vehicle with this condenser, the condenser must be completely replaced. Refer to the ⇒ Electronic Parts Catalog (ÉTKA).
- Condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately or is not available as a replacement part, the condenser must be replaced after flushing (with the dryer cartridge installed). Refer to
 ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).





Audi Q5 Hybrid

Vehicle	Required adapters for the connections to / from A/C compressor	Required adapters for the connections to re- ceiver/dryer	Miscella- neous	
Audi Q5 (8R_) from MY 2011	Required adapters for the connections to A/C compressor Compressor Compressor Manufacturer Denso Low pressure side: Refrigerant Circuits Adapter Set Adapter 12 - VAS 6338/12- High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3-	condenser version, remove the dryer cartridge from the receiver/dryer on the condenser before flushing and then seal the opening again (see note).	horise instal DI A	ate or commercial purposes, in part or in whole, is r 3. AUDI AG does not guarantee or accept any liabi rmation in this document. Copyright by AUDI AG.

Vehicle	Required adapters for the connections to / from A/C compressor	Required adapters for the connections to re- ceiver/dryer	Miscella- neous
Additionally on vehicles wither cooling module	ed by copyright. Copying for ted unless authorised by Al respect to the correctness	To flush the circuit with the evaporator in the A/C unit and the condenser Refrigerant Circuits Adapter Set 1 - reprive Adapter Set 2 - reprive Adapter Set 3 - reprive Adapter Set 3 - reprive Adapter Set 1 - reprive Adapter Set 3 - reprive Adapt	◆ Hybrid part Battery,

Vehicle	Required adapters for the connections to / from A/C compressor	Required adapters for the connections to re- ceiver/dryer	Miscella- neous
permitted un	copyright. Copying for prival ess authorised by AUDI ACt to the correctness of info	. AUDI AG DES NOT GUARANTE Or a	The expansion valve in the refrigerant lines for the second evaporator is removed and the Refrigerant Circuits Adapter 36 - VAS 6338/36-is installed (or the removed expansion of valve is installed) refer to page 97 .

	Audi 100
Αυδι	Refrigera

Vehicle	Required adapters for the connections to / from A/C compressor	Required adapters for the connections to re- ceiver/dryer	Miscella- neous
	Required adapter / lines for the connections to the electrically driven A/C compressor (to flush the A/C compressor) (refer to ⇒ page 114) (flushing the electrically-driven A/C compressor).		◆ The refrigerant oil is removed by flushing in the flow direction for electrically-driven A/C compressors (because of the installed valve it is not possible to flush against the flow direction).
			◆ To flush, arrange the A/C compressor so that the connection for the refrigerant line on the high pressure side is as low as possible.







- In vehicles with two evaporators, the refrigerant circuit is flushed in two / three work steps.
- Currently the expansion valves on the evaporator in the A/C unit and on the evaporator in the battery cooling module have the same connections (only the control characteristics and those on the Hybrid Battery Refrigerant Shut-Off Valve 2 - N517- are different).
- The refrigerant circuit cannot be rinsed with a Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- installed in the circuit to the evaporator in the A/C unit. The Hybrid Battery Refrig erant Shut-Off Valve 1 Hybrid Battery Řefrigerant Šhut-Off Valve 1 - N516- is in a constricted location and prevents the refrigerant from reaching a sufficient flow speed. If a Shut-Off Valve - VAS 6338/42- is available, install it for the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- and open. If the Shut-Off Valves - VAS 6338/42- are not available, but there are two A/C Adapter Set - Adapters 5 - VAG 1785/5- , the circuit with the evaporator in the A/C unit can be flushed in one work procedure (reassemble the circuit with a filler hose and two A/C Adapter Set - Adapters 5 - VAG 1785/5-). If the Shut-Off Valve - VAS 6338/42- is not available and there is only one A/C Adapter Set - Adapters 5 - VAG 1785/5available, the circuit must be flushed in two steps. From the low pressure connection on the A/C compressor via the evaporator in the A/C unit up to the connection for the removed Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- and from the connection for the removed Hybrid Battery Refrigerant Shut whole, is not Off Valve 1/11-Hybrid Battery Retrigerant Shut-Off Valve 10-accept any liability N516- via the condenser to the high pressure connection on AUDI AG. the A/C compressor.
- The Hybrid Battery Refrigerant Shut-Off Valve 1 N516must be replaced after flushing. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Depending on the condenser manufacturer, the receiver/dryer version for these vehicles varies. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). The receiver/dryer may be attached to or integrated in the condenser, depending on the version of the condenser. The integrated receiver/dryer has a dryer cartridge that is no longer available as a replacement part. In the event there is a complaint on a vehicle with this condenser, the condenser must be completely replaced. Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- Condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately or is not available as a replacement part, the condenser must be replaced after flushing (with the dryer cartridge installed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .



Audi 100, Audi A6 (4A_, 4B_ and 4F_), Audi allroad and Audi V8

Vehicle	Required adapters for the connections to A/C compressor	Required adapters for the connections to the reservoir	Miscella- neous	
Audi 100 / Audi A6 (4A_) through MY 1998 Audi A6 (4B_) from MY 1998 Audi all- road (4B_) through MY 2005 Audi V8 (4C_) through 1994	 Compressor manufacturer "Zexel / Valeo" (threaded connections) Low pressure side A/C Adapter Set Adapter 8 - VAG 1785/8- High pressure side A/C Adapter Set Adapter Set Adapter Set Adapter 7 - VAS 1785/7- 	Reservoir with different connection versions ◆ Version "1" - Threaded connection at input Refrigerant Circuits Adapter Set 1 - Adapter 9 - VAS 6338/9 - Threaded connection at output A/C Adapter Set - Adapter 8 - VAG 1785/8-	- Restrictor removed, connec- tions re- connected	
7507	- Compressor manufacturer "Denso" (block connections with radial and axial sealing) ◆ Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- ◆ High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 2 - VAS 6338/2-	Version "2" Threaded connection at input Refrigerant Circuits Adapter Set 1 - Adapter 9 - VAS 6338/9 - Block connection with axial sealing at output Refrigerant Circuits Adapter Set 1 - Adapter 10 - VAS 6338/10 - Block connections with axial sealing meant at input and out AG to the put Refrigerant Circuits Adapter Set 1 - Adapter 10 - VAS 6338/10 - (necessary twice).	loes not guarantee	part or in whole, is not or accept any liability right by AUDI AG.



Vehicle	Required adapters for the connections to A/C compressor	Required adapters for the connections to the reservoir	Miscella- neous	
Audi A6 (4F_) from MY 2005	- Compressor manufacturer "Denso" (block connections with radial sealing) ◆ Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- ◆ High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS Protecter 12 - VAS	connections at input and output Refrigerant Circuits Adapter Set 1 - Adapter 8 - VAS 6338/8- (necessary two times)	commercial numo	ses, in part or in whole, is not
	6338/3- permitte	d unless authorised by AUDI AG. AU espect to the correctness of informati	DI AG does not gu on in this documer	arantee or accept any liability t. Copyright by AUDI AG.



The specifications for the Audi A6 (4F_) from MY 2005 also apply to the Audi S6 and Audi RS 6.

Audi A6 (4G_ or 4X_ for China), Audi A7 (4G_ or 4X_ for China)

Vehicle	Required adapters for the connections to A/C compressor	Required adapters for the connections to re- ceiver/dryer	Miscella- neous
Audi A6 (4G_/ 4X_) from MY 2011 Audi A7 (4G_/ 4X_) from MY 2011	 Compressor manufacturer "Denso" Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter Set 1 - Adapter 3 - VAS 6338/3- 	Receiver/dryer (different versions) No adapter needed, the receiver/dryer remains installed Depending on the condenser version, remove the dryer cartridge from the receiver/dryer on the condenser before flushing and then seal the opening again (see note).	The expansion valve is removed and the Refrigerant Circuits Adapter 18 - VAS 6338/18- (or the removed expansion valve is drilled for flushing and installed again). Refer to ⇒ page 97 .



- The type designation 4X_ is used instead of the type designation 4G_ for specific versions in China
- ♦ Depending on the condenser manufacturer, the receiver/dryer version for these vehicles varies. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ÉTKA) .
- ♦ Condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately or is not available as a replacement part, the condenser must be replaced after flushing (with the dryer cartridge installed). Refer to
 ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Audi A6 Hybrid and Audi A6 e-tron

Vehicle	Required adapters for the connections to / from A/C compressor	Required adapters for the connections to re- ceiver/dryer	Miscella- neous	
Audi A6 (4G_) from MY 2012	aaaa aa poiiiillio	Receiver/dryer (different versions) No adapter needed, the receiver/dryer remains installed A6 Hybrid Depending on the condenser version, remove the dryer cartridge from the receiver/dryer on the condenser before flushing and then seal the opening again (see note). A6 e-tron Detach the receiver/dryer from the bracket. With the by crefrigerant lines are on the bottom (in this way the refrigerant is evacuated as a liquid when flushing and the receiver/dryer does not ice over). Refer to the notes.	PDI AGING CAL HOL GO	larantee or accept any nability

Vehicle	Required adapters for the connections to / from A/C compressor	Required adapters for the connections to re- ceiver/dryer	Miscella- neous
	Protected by copyrig permitted unless au with respect to th	thorised by AUI 9 AUI AUI AG does	Expansion valve in the refrigerant lines to the second evaporator / heat exchanger is removed and Refrigerant or in whole, is removed and Refrigerant Circuits Adapter 36 - VAS 6338/36- or Refrigerant Circuits Adapter 18 - VAS 6338/18- (different connections depending on the version) is installed (or the old removed expansion valve is drilled for flushing and is reinstalled; refer to page 7).



Vehicle	Required adapters for the connections to / from A/C compressor	Required adapters for the connections to re- ceiver/dryer	Miscella- neous	
	Required adapter / lines for the connections to the electrically driven A/C compressor (to flush the A/C compressor) (refer to ⇒ page 114) (flushing the electrically-driven A/C compressor).		♦ The refrigerant oil is removed by flushing in the flow direction for electrically-driven A/C compressors (because of the installed valve it is not possible to flush against the flow direction).	
		Protected by copyright. Copyi permitted unless authorised be with respect to the correctr	To flush, arrange the A/C compressor so that the connection for the refrigerant line on the solution sure side is as low as possible.	mmercial purposes, in part or in whole, is not AG does not guarantee or accept any liability in this document. Copyright by AUDI AG.



- The type designation 4X_ is used instead of the type designation 4G_ for specific versions in China
- For vehicles with two evaporators (one evaporator in the A/C unit and one evaporator in the battery cooling module or on the high-voltage battery heat exchanger, for example in the Audi A6 e-tron), the refrigerant circuit is flushed in two/three
- The expansion valve on the evaporator in the A/C unit and on the evaporator in the battery cooling module (Hybrid Battery Refrigerant Shut-Off Valve 2 - N517- on the A6 Hybrid or the expansion valve with the Refrigerant Shut-Off Valve 2 - N640- on the A6 e-tron) does not currently always have the same connections (when they have the same connections, they differ in the control characteristic). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- The refrigerant circuit cannot be flushed with a shut-off valve installed in the circuit to the evaporator in the A/C unit (the Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- on an A6 Hybrid or the Refrigerant Shut-Off Valve - V424- on an A6 e-tron). The Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- (the Refrigerant Shut-Off Valve Refrigerant Shut-Off Valve - V424-) is a constriction and prevents the refrigerant from flowing at a suitable speed. If a Shut-Off Valve - VAS 6338/42- is available, install it for the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516-(the Refrigerant Shut-Off Valve Refrigerant Shut-Off Valve -V424-) and open. If the Shut-Off Valves - VAS 6338/42- are not available, but there are two A/C Adapter Set - Adapters 5 - VAG 1785/5- , the circuit with the evaporator in the A/C unit can be flushed in one work procedure (reassemble the circuit with a filler hose and two A/C Adapter Set - Adapters 5 - VAG 1785/5-). If the Shut-Off Valve - VAS 6338/42is not available and there is only one A/C Adapter Set -Adapters 5 - VAG 1785/5- available, the circuit must be flushed in two steps. From the low pressure connection on the A/C compressor via the evaporator in the A/C unit up to the connection for the removed Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- (Refrigerant Shut-Off Valve Refrigerant Shut-Off Valve - V424-) and from the connection for the removed Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- (Refrigerant Shut-Off Valve Refrigerant Shut-Off Valve - V424-) via the condenser to the high pressure connection on the A/C compressor.
- The Hybrid Battery Refrigerant Shut-Off Valve 1 N516- (the Refrigerant Shut-Off Valve 1 Refrigerant Shut-Off Valve pying for private or commercial purposes, in part or in whole, is not V424-) must be replaced after flushing. Refer to a Hearting, AUDI AG. AUDI AG does not guarantee or accept any liability Ventilation and Air Conditioning; Rep. Gr. Refrigerant Circuit (vehicle-specific repair manual).
- The receiver/dryer on the Audi A6 e-tron must be replaced after flushing. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit; Receiver/Dryer, Removing and Installing .
- Depending on the condenser manufacturer, the receiver/dryer version for these vehicles varies. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). The receiver/dryer may be attached to or integrated in the condenser, depending on the version of the condenser. The integrated receiver/dryer has a dryer cartridge that is no longer available as a



- replacement part. In the event there is a complaint on a vehicle with this condenser, the condenser must be completely replaced. Refer to the ⇒ Electronic Parts Catalog (ÉTKA).
- Condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately or is not available as a replacement part, the condenser must be replaced after flushing (with the dryer cartridge installed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).
- On the Audi A6 hybrid it can be helpful to remove both refrigerant lines in the engine compartment from the miner Copying for private or commercial purposes, in part or in whole, is not heat exchanger to flush the components in the pattery could be information in this document. Controlled the state of the components in the pattery could be and the related and the related to the controlled the state of the country of the controlled to the controll ing module and the related refrigerant lines. Then the adapters needed for flushing and the corresponding refrigerant hoses can be installed and removed more easily. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- On the Audi A6 hybrid, if the charge hose knurled nut cannot be screwed onto the connection (depending on the tolerance at the refrigerant pipe outlet at the connection) with an Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3attached to the refrigerant line for the evaporator in the battery cooling module, then carefully bend the refrigerant pipe approximately 1 mm to the side.

Audi A6 (4A_ or 48_ for China), Audi A7 (4K_)

Vehicle	Required adapters for the connections to A/C compressor	Required adapters for the connections to re- ceiver/dryer	Miscella- neous
Audi A6 (4A_ or for 48_ for Chi- na) from MY 2019 Audi A7 (4K) from MY 2018	 Compressor manufacturer "Denso" Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12-connected to the A/C Service Station and the Refrigerant Circuit Adapter Set - Adapter Set - Adapter - VAS 6338/48- High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter Set 1 - Adapter 3 - VAS 6338/3- 	No adapter required, dryer is removed from receiver/dryer on condenser and the opening is sealed.	The expansion valve is removed and Refrigerant Circuits Adapter Set 1 - Adapter 44 - VAS 6338/44- is installed (or an old expansion valve is drilled on and installed as an adapter). Refer to ⇒ page 97 and the ⇒ Electronic Parts Catalog (ET-KA) .





Condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately or is not available as a replacement part, the condenser must be replaced after flushing (with the dryer cartridge installed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicles) pecific repair manual) and the ⇒ Electronic Parts Catalog (ETKÁ).

Audi A7 (4K_) TFSI e from MY 2019

Vehicle	Required adapters for the connections to A/C compressor	Necessary adapter for the connections to the receiver/dry- er / for the check valves and shut-off valves	Miscellane- ous	
Audi A7 (4K_) TFSI e from MY 2019 ◆ Vehi- cle with one evap ora- tor	side: Refrig- erant Circuits Adapter Set	Receiver/Dryer No adapter required, dryer is removed from receiver/dryer on condenser and the opening is sealed. Protected by copyright. Copyin permitted unless authorised by with respect to the correctness.		ercial purposes, in part or in whole, is not does not guarantee or accept any liability is document. Copyright by AUDI AG.
		Check Valves - The four check valves are removed and installed for the shut-off valves (-6338/47-1- and -6338/47-2-) from the Shut-off Valves - 6338/47	The shut-off valves installed for the check valves are opened or closed according to the area to be flushed. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).	

Vehicle	Required adapters for the connections to A/C compressor	Necessary adapter for the connections to the receiver/dry- er / for the check valves and shut-off valves	Miscellane- ous
		Shut-off valve Remove the Refrigerant Shut-Off Valve Refrigerant Shut-Off Valve - V424-and install a Shut-off Valve - VAS 6338/42-for it.	Then open or close the shut-off valve installed for the shut-off valve according to the area to be flushed. Replace the Refrigerant Shut-Off Valve - V424- after flushing.







- On the Audi A7 TFSIe, the refrigerant circuit is flushed in four steps (flushing cycles). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (A/C System Refrigerant Circuit, Cleaning).
- On the Audi A7 TFSIe, not only do the installed shut-off valves have to be in the correct position (open or closed), but also the electric valves (in the valve block) have to be in the correct position so that the entire refrigerant circuit can be flushed. The activation of the electric valves takes place via different routines, which are stored in the respective control module (for example in the Thermal Management Control Module - J1024-). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (A/C System Refrigerant Circuit, Cleaning).
- To flush, the circuit on the Audi A7 TFSIe is divided into multiple sections and then cleaned respectively in a flushing cycle. The division takes place by activating the installed electrically activated valves and via the installed manually activated hand shut-off valves. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (A/C System Refrigerant Circuit, Cleaning) use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.
- The design of the different flushing circuits for the Audi A7 TFSIe is described in the vehicle-specific repair manual. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (A/C System Refrigerant Circuit, Cleaning).
- Condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately or is not available as a replacement part, the condenser must be replaced after flushing (with the dryer cartridge installed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Eľectronic Parts`Catalog (ETKA) .
- After flushing, the refrigerant receiver on the heat exchanger for heat pump operation must be replaced. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refriger-
- The Refrigerant Shut-Off Valve V424- must be replaced after flushing. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit.







Audi A8

Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiver/dryer	Miscella- neous	
Audi A8 (4D_) from MY 1994	 Compressor manufacturer "Zexel / Valeo" (threaded connections) Low pressure side A/C Adapter Set Adapter 8 - VAG 1785/8- High pressure side A/C Adapter Set Adapter Set Adapter 7 - VAS 1785/7- 	Reservoir with different connection versions ◆ Version "1" - Threaded connection at input Refrigerant Circuits Adapter Set 1 - Adapter 9 - VAS 6338/9 - Threaded connection at output A/C Adapter Set - Adapter 8 - VAG 1785/8-	- Restrictor removed, connections reconnected	
	- Compressor manufacturer "Denso" (block connections with radial and paxial sealing) ◆ Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- ◆ High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 2 - VAS 6338/2-	 Version "2" Threaded connection at input Refrigerant Circuits Adapter Set 1 - Copy Adapter 9" VAS cial prised 6338/0" AUDI AG does not be sufficient on this doct of the sufficient of the s	urposes, in part or of guarantee or acc ment. Copyright by	in whole, is not ept any liability / AUDI AG.

Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiver/dryer	Miscella- neous	
Audi A8 (4E_) from MY 2003	 Compressor manufacturer "Denso" (block connections with radial sealing) Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3- 	Reservoir - Block connections with radial sealing at input and output • Refrigerant Circuits Adapter Set 1 - Adapter 8 - VAS 6338/8- (necessary two times)		
Audi A8 (4H_) from MY 2010	 Compressor manufacturer "Denso" (block connections with radial sealing) Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3- 	 No adapter required, desiccant bag is removed from receiver/dryer on the condenser and the opening is sealed again for flushing. 		by copyright. Copying for private or commercial purposes, in part or in whole, is unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liab pect to the correctness of information in this document. Copyright by AUDI AG.

Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiver/dryer	Miscella- neous
♦ Additio- nally on a vehi- cle with two evap- ora- tors (four zone A/C sys- tem)		To flush the circuit with the evaporator in the front A/C unit ◆ Refrigerant Circuits Adapter Set 1 - Adapter 5 - VAS 6338/5- for sealing the "low pressure side" connection (for the second evaporator). ◆ Refrigerant Circuits Adapter Set 1 - Adapter 11 - VAS 6338/11- for seal-	
tem)		ing the "high pressure side" connection (for the second evaporator). The adapter may need an additional hole (see below) so that the refrigerant lines can be sealed with the Refrigerant Circuits Adapter Set 1 - Adapter 5 - VAS 6338/5- and Refrigerant Circuits Adapter Set 1 - Adapter 11 Refrigerant Circuits Adapter Set 1 - Adapter Set 1 - Adapter 11 - VAS 6338/11	





Vehicle	Required adapters for the connections to A/C compressor	Adapters necessary for the connections to the reservoir or receiver/dryer	Miscella- neous
		To flush the second evaporator and corresponding lines ◆ Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3- for connecting the A/C service station to the "low-pressure side" connection (for the second evaporator). ◆ Refrigerant Circuits Adapter Set 1 - Adapter 4 - VAS 6338/4- for connecting the A/C service station to the "high-pressure side" connection (for the second evaporator). • It may be necessary to rework the adapter (see below) so that the refrigerant line can be attached to the Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3	The expansion valve in the refrigerant lines for the second evaporator is removed and the Refrigerant Circuits Adapter 18 - VAS 6338/18- is installed (or the old removed expansion valve is drilled for flushing and reinstalled (Refer to page 17).



- In vehicles with two evaporators, the refrigerant circuit is flushed in two work steps.
- Currently the front and rear expansion valves have the same connections (only the control characteristics are different)

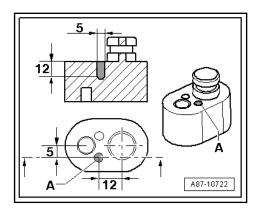
Drill an additional hole in the Refrigerant Circuits Adapter Set 1 - Adapter 5 - VAS 6338/5- and Refrigerant Circuits Adapter Set 1 - Adapter 11 Refrigerant Circuits Adapter Set 1 - Adapter 11 -VAS 6338/11-.





Drill a hole -A- in addition to the already existing hole (the dimensions in the illustration are given in mm).

Rework the Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3- .





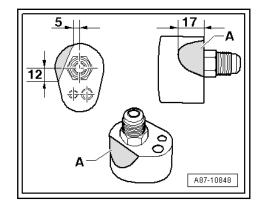


Αυδι

By grinding or filing down material in section -A-, rework the Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3so that it can be connected without bending the refrigerant line (the dimensions in the illustration are in mm).

Audi A8 Hybrid

Vehicle	Required adapters for the connections to / from A/C compressor	Required adapters for the connections to re- ceiver/dryer	Miscella- neous
Audi A8 (4H_) from MY 2012	Required adapters for the connections to A/C compressor Compressor Compressor Manufacturer "Denso" Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3-	Receiver/dryer (different versions) No adapter needed, the receiver/dryer remains installed Depending on the condenser version, remove the dryer cartridge from the receiver/dryer on the condenser before flushing and then seal the opening again (see note).	Expansion valve is removed and Refrigerant Circuits Adapter 18 - VAS 6338/18- (or an old, drilled out and cleaned expansion valve is installed, refer to page 97). The refrigerant line with the inner heat exchanger remains installed or will be installed or will be installed after installing the adapter.







Vehicle	Required adapters for the connections to / from A/C compressor	Required adapters for the connections to re- ceiver/dryer	Miscella- neous
Additionally on vehicles with battery cooling module	ected by copyright. Copying	To flush the circuit with the evaporator in the A/C unit and the condenser ◆ Refrigerant Circuits Adapter Set 1 - Adapter 5 - VAS 6338/5- for sealing the "low pressure side" connection (to the second evaporator in the battery cooling module) ◆ Refrigerant Circuits Adapter Set 1 - Adapter 11 - VAS 6338/11- for sealing the "high pressure side" connection (to the second evaporator in the battery cooling module) ◆ Shut-Off Valves - VAS 6338/42- or A/C Adapter Set - Adapter 5 - VAG 1785/5- to install for the removed Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- (refer to the notes).	To flush the circuit, there are several methods ◆ Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant and a Shut-Off Valve 1 N516-removed and a Shut-Off Valve - VAS 6338/42-installed (refer to the notes below) Replace the Hybrid Battery Refrigerant Shut-Off Valve 1
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Vehicle	Required adapters for the connections to / from A/C compressor	Required adapters for the connections to re- ceiver/dryer	Miscella- neous	
		To flush the evaporator in the battery cooling module and the corresponding lines ◆ Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3- for connecting the A/C service station to the "low-pressure side" connection (for the second evaporator). ◆ Refrigerant Circuits Adapter Set 1 - Adapter 4 - VAS 6338/4- for connecting the A/C service station for the "high-pressure side" connection (for the second evaporator).	LValve IS by A	or private or commercial purposes, in part or in whole, is JDI AG. AUDI AG does not guarantee or accept any lia of information in this document. Copyright by AUDI AG



Vehicle	Required adapters for the connections to / from A/C compressor	Required adapters for the connections to re- ceiver/dryer	Miscella- neous	
	Required adapter / lines for the connections to the electrically driven A/C compressor (to flush the A/C compressor) (refer to page 114) (flushing the electrically-driven A/C compressor).	Prepe		t. Copying for private or commercial purposes, in part or in whole, is not orised by AUDI AG. AUDI AG does not guarantee or accept any liability correctness of information in this document. Copyright by AUDI AG.



- In vehicles with two evaporators, the refrigerant circuit is flushed in two / three work steps.
- Currently the expansion valve on the evaporator in the A/C unit and on the evaporator in the battery cooling module do not have the same connections.
- The refrigerant circuit cannot be rinsed with a Hybrid Batterye, is not Refrigerant Shut-Off Valve 1 - N516- installed in the circuit to the evaporator in the A/C unit. The Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- is in a constricted location and prevents the refrigerant from reaching a sufficient flow speed. If a Shut-Off Valve - VAS 6338/42- is available, install and open it for the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Réfrigerant Shut-Off Valve 1 - N516- . If the Shut-Off Valve - VAS 6338/42- is not available, but there are two A/C Adapter Set - Adapters 5 - VAG 1785/5- and the circuit with the evaporator in the A/C unit can be flushed in one work procedure (reassemble the circuit with a filler hose and two A/C Adapter Set - Adapters 5 - VAG 1785/5-). If the Shut-Off Valve - VAS 6338/42- is not available and there is only one A/C Adapter Set - Adapters 5 - VAG 1785/5available, the circuit must be flushed in two steps. From the low pressure connection on the A/C compressor via the evaporator in the A/C unit up to the connection for the removed Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- and from the connection for the removed Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 -N516- via the condenser to the high pressure connection on the A/C compressor.
- The Hybrid Battery Refrigerant Shut-Off Valve 1 N516must be replaced after flushing. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Depending on the condenser manufacturer, the receiver/dryer version for these vehicles varies. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). The receiver/dryer may be attached to or integrated in the condenser, depending on the version of the condenser. The integrated receiver/dryer has a dryer cartridge that is no longer available as a replacement part. In the event there is a complaint on a vehicle with this condenser, the condenser must be completely replaced. Refer to the ⇒ Electronic Parts Catalog (ETKA).
- Condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately or is not available as a replacement part, the condenser must be replaced after flushing (with the dryer cartridge installed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Ŕep. Gr. 87 Refrigerant Circuit (vehicle-specific repair manual) and the *⇒ Electronic Parts Catalog (ETKA) .*



Audi A8 (4N)

Vehicle	Required adapters for the connections to A/C compressor	Required adapters for connections to receiver/dryer / to second evaporator	Miscella- neous
Audi A8 (4N) from MY 2018 ◆ Vehicle with one evaporator	- Compressor manufacturer "Denso" (block connections with radial sealing) ◆ Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12-connected to the A/C Service Station and the Refrigerant Circuit Adapter Set - Adapter Set - Adapter - VAS 6338/48- ◆ High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3-	No adapter required, dryer is removed from receiver/dryer on condenser and the opening is sealed.	The expansion valve is removed and Refrigerant Circuits Adapter Set 1 - Adapter 44 - VAS 6338/44- is installed (or an old expansion valve is drilled on and installed as an adapter). Refer to ⇒ page 97 and the ⇒ Electronic Parts Catalog (ET-KA) .





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91	Refrigerant	R134a	Servicing	- Edition	12.202

Vehicle	Required adapters for the connections to A/C compressor	Required adapters for connections to receiver/dryer / to second evaporator	Miscella- neous
Additionally on vehicles with two evaporators (four zone A/C system)		To flush the circuit with the evaporator in the front A/C unit ◆ Refrigerant Circuits Adapter Set 1 - Adapter 44 - VAS 6338/44- and Re- frigerant Circuits Adapter Set 1 - Adapter 43 - VAS 6338/43- (to seal the refrigerant cir- cuit to the second evaporator)	The expansion valve is removed from the evaporator in the front of the A/C unit and Refrigerant Circuits Adapter Set 1 - Adapter 44 - VAS 6338/44-is installed. Expansion valve is removed from the refrigerant lines to the evaporator in the rear A/C unit and Refrigerant Circuits Adapter Set 1 - Adapter 43 - VAS 6338/43-is installed.







Vehicle	Required adapters for the connections to A/C compressor	Required adapters for connections to receiver/dryer / to second evaporator	Miscella- neous	
	Protect	To flush the second evaporator and corresponding lines ◆ Refrigerant Circuits Adapter Set 1 - Adapter 44 - VAS 6338/44- and Refrigerant Circuits Adapter Set 1 - Adapter 43 - VAS 6338/43- (to seal the refrigerant circuit to the evaporator in the front of the A/C unit)	evaporator in the front A/C unit and Refrigerant Circuits Adapter Set 1 - Adapter 43 - VAS 6338/43-is installed. Expansion valve is removed from the refrigerant lines to the evaporator in the rear A/C unit and Refrigerant Circuits Adapter Set 1 - Adapter 44 - VAS 6338/44-is instal-	poses, in part or in who
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- In vehicles with two evaporators, the refrigerant circuit is flushed in two work steps.
- On vehicles with two evaporators, the refrigerant circuit with the evaporator in the front of the A/C unit is flushed first. The refrigerant circuit to the second evaporator (in the rear A/C unit) must be blocked off so that the refrigerant flows in the specified direction during the flushing procedure. This is done by removing the expansion valve in the refrigerant lines to the second evaporator and installing the Flushing Adapter - VAS 6338/43- (closed adapter). After the refriger-ant circuit with the evaporator is flushed, switch both adapters Refrigerant Circuit's Adapter Set 1 - Adapter 43 Flushing Adapter - VAS 6338/43- and Refrigerant Circuits Adapter Set 1 - Adapter 44 Expansion Valve - VAS 6338/44- and flush the refrigerant circuit with the evaporator in the rear of the A/C unit.



Audi A8 (4N_) TFSIe from MY 2019

Vehicle	Required adapters for the connections to A/C compressor	Necessary adapter for the connections to the receiver/dry- er / for the check valves and shut-off valves	Miscellane- ous	
Audi A8 (4N_) TFSIe from MY 2019 ◆ Veh cle with one eva ora- tor	side: Refrig- erant Circuits Adapter Set 1 - Adapter	Receiver/Dryer No adapter required, dryer is removed from receiver/dryer on condenser and the opening is sealed.	The expansion valve is removed and Refrigerant Circuits Adapter Set 1 - Adapter 44 - VAS 6338/44- is installed (or an old expansion valve is drilled on and installed as an adapter). Refer to ⇒ page 97 and the ⇒ Electronic Parts Catalog (ETKA) .	
		Check Valves The four check valves are removed and installed for the more shuttoff valves as correct-6338/47-2-) from the Shut-off Valves - 6338/47	closed activity cording to the area to	accept any liability

Vehicle	Required adapters for the connections to A/C compressor	Necessary adapter for the connections to the receiver/dry- er / for the check valves and shut-off valves	Miscellane- ous
		Shut-off valve Remove the Refrigerant Shut- Off Valve Refrigerant Shut-Off Valve - V424- and install a Shut-off Valve - VAS 6338/42- for it.	Then open or close the shut-off valve installed for the shut-off valve according to the area to be flushed. Replace the Refrigerant Shut-Off Valve - V424- after flushing.









- On the Audi A8 TFSIe, the refrigerant circuit is flushed in four steps (flushing cycles). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (A/C System Refrigerant Circuit, Cleaning).
- On the Audi A8 TFSIe, not only do the installed shut-off valves have to be in the correct position (open or closed), but also the electric valves (in the valve block) have to be in the correct position so that the entire refrigerant circuit can be flushed. The activation of the electric valves takes place via different routines, which are stored in the respective control module (for example in the Thermal Management Control Module - J1024-). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (A/C System Refrigerant Circuit, Cleaning).
- To flush, the circuit on the Audi A8 TFSIe is divided into multiple sections and then cleaned respectively in a flushing cycle. The division takes place by activating the installed electrically activated valves and via the installed manually activated hand shut-off valves. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (A/C System Refrigerant Circuit, Cleaning) use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.
- The design of the different flushing circuits for the Audi A8 TFSIe is described in the vehicle-specific repair manual. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (A/C System Refrigerant Circuit, Cleaning).
- Condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately or is not available as a replacement part, the condenser must be replaced after flushing (with the dryer cartridge installed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Eľectronic Parts`Catalog (ETKA) .
- After flushing, the refrigerant receiver on the heat exchanger for heat pump operation must be replaced. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refriger-
- The Refrigerant Shut-Off Valve V424- must be replaced after flushing. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit.





Audi Q7 (4L_)

Vehicle	Required adapters for the connections to A/C compressor	Required adapters for connections to receiver/dryer / to second evaporator	Miscella- neous	
Audi Q7 (4L_) from MY 2006 ◆ Vehi- cles with one evap- ora- tor (two zone A/C sys- tem)	ing) ◆ Low pressure side: Refrig-	permitted unless aut	h 7 m1s 2 d A Y o ypDIA	ate or commercial purposes, in part or in whole, is not G. AUDI AG does not guarantee or accept any liability brmation in this document. Copyright by AUDI AG.

Vehicle	Required adapters for the connections to A/C compressor	Required adapters for connections to receiver/dryer / to second evaporator	Miscella- neous	
Additionally on vehicles with two evaporators (four zone A/C system)			Expansion valve on second evaporator removed and Refrigerant Circuits Adapter Set 1 - Adapter 17 - VAS 6338/17-installed (or drilled expansion valve, for example 7L0 820 712 A installed page	if by copyright. Copying for private or commercial purposes, in part or in whole, is not
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In vehicles with two evaporators, the refrigerant circuit is flushed in two work steps.



Audi Q7 (4M_) and Audi Q8 (4M_)

Vehicle	Required adapters for the connections to A/C compressor	Required adapters for connections to receiver/dryer / to second evaporator	Miscella- neous
Audi Q7 (4M_) from MY 2016 Audi Q8 (4M_) 2018 ◆ Vehi- cle with one evap- ora- tor	 Compressor manufacturer "Denso" (block connections with radial sealing) Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3- 	No adapter required, dryer is removed from receiver/dryer on condenser and the opening is sealed.	The expansion valve is removed and Refrigerant Circuits Adapter Set 1 - Adapter 44 - VAS 6338/44- is installed (or an old expansion valve is drilled on and installed as an adapter). Refer to page 97 and the ⇒ Electronic Parts Catalog (ET-KA).

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Vehicle	Required adapters for the connections to A/C compressor	Required adapters for connections to receiver/dryer / to second evaporator	Miscella- neous	
Additionally on vehicles with two evaporators (four zone A/C system)		To flush the circuit with the evaporator in the front A/C unit ◆ Refrigerant Circuits Adapter Set 1 - Adapter 44 - VAS 6338/44- and Refrigerant Circuits Adapter Set 1 - Adapter 43 - VAS 6338/43- (to seal the refrigerant circuit to the second evaporator) Prote perm wi	from the evaporator in the front of the A/C unit and Refrigerant Circuits Adapter Set 1 - Adapter 44 - VAS 6338/44- is installed. Expansion	Copying for private or commercial purposes, in part or in whole, is not sed by AUDI AG. AUDI AG does not guarantee or accept any liability rectness of information in this document. Copyright by AUDI AG.



Vehicle	Required adapters for the connections to A/C compressor	Required adapters for connections to receiver/dryer / to second evaporator	Miscella- neous	
		To flush the second evaporator and corresponding lines ◆ Refrigerant Circuits Adapter Set 1 - Adapter 44 - VAS 6338/44- and Refrigerant Circuits Adapter Set 1 - Adapter 43 - VAS 6338/43- (to seal the refrigerant circuit to the evaporator in the front of the A/C unit)	Expansion valve is removed from the evaporator in the front A/C unit and Refrigerant Circuits Adapter Set 1 - Adapter 43 - VAS 6338/43-is installed. Expansion valve is removed from the refrigerant lines to the evaporator in the rear A/C unit and Refrigerant Circuits	
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- In vehicles with two evaporators, the refrigerant circuit is flushed in two work steps.
- On vehicles with two evaporators, the refrigerant circuit with the evaporator in the front of the A/C unit is flushed first. The refrigerant circuit to the second evaporator (in the rear A/C unit) must be blocked off so that the refrigerant flows in the specified direction during the flushing procedure. This is done by removing the expansion valve in the refrigerant lines to the second evaporator and installing the Flushing Adapter - VAS 6338/43- (closed adapter). After the refriger-ant circuit with the evaporator is flushed, switch both adapters Refrigerant Circuit's Adapter Set 1 - Adapter 43 Flushing Adapter - VAS 6338/43- and Refrigerant Circuits Adapter Set 1 - Adapter 44 Expansion Valve - VAS 6338/44- and flush the refrigerant circuit with the evaporator in the rear of the A/C unit.



Audi Q7 e-tron (4M_), Audi Q7 TFSle (4M_), Audi Q8 TFSle (4M_)

Vehicle	Required adapters for the connections to A/C compressor	Necessary adapter for the connections to the receiver/dry- er / for the check valves and shut-off valves	Miscellane- ous	
Audi Q7 e- tron (4M_) from MY 2016 Audi Q7 TFSIe (4M_) Audi Q8 TFSIe (4M_) ◆ Vehi- cle with one evap- ora- tor	sure side: Refrigerant Circuits	Receiver/Dryer No adapter required, dryer is removed from receiver/dryer on condenser and the opening is sealed.	The expansion valve is removed and Refrigerant Circuits Adapter Set 1 - Adapter 44 - VAS 6338/44- is installed (or an old expansion valve is drilled on and installed as an adapter). Refer to ⇒ page 97 and the ⇒ Electronic Parts Catalog (ETKA).	
	permitted ur	Check Valves The four check valves are removed and installed for the shut-off valves (-6338/47-1- and -6338/47-2-) from the Shut-off Valves - 6338/47- copyright. Copying for private oless authorised by AUDI AG. At act to the correctness of informatic control of the correctness	Refer to ⇒ Heating, Ventilation	s, in part or in whole, is not antee or accept any liability Copyright by AUDI AG.
		Shut-off valve Remove the Refrigerant Shut-Off Valve Refrigerant Shut-Off Valve - V424- and install a Shut-off Valve - VAS 6338/42- for it.	Then open or close the shut-off valve installed for the shut-off valve according to the area to be flushed. Replace the Refrigerant Shut-Off Valve - V424- after flushing.	



- On these vehicles, the refrigerant circuit is flushed in two or four steps (flushing cycles). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (A/C System Refrigerant Circuit, Cleaning).
- On the Audi Q7 e-tron, not only do the installed shut-off valves have to be in the correct position (open or closed), but also the electric valves (in the valve block) have to be in the correct position so that the entire refrigerant circuit can be flushed. The activation of the electric valves takes place via different routines, which are stored in the respective control module (for example in the Thermal Management Control Module - J1024-). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (A/C System Refrigerant Circuit, Cleaning).
- To flush on the Audi Q7 e-tron the refrigerant circuit is divided into multiple sections and then cleaned respectively in a flushing cycle. The division takes place by activating the installed electrically activated valves and via the installed manually activated hand shut-off valves. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (A/C System Refrigerant Circuit, Cleaning) use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.
- The design of the different flushing circuits for the Audi Q7 e-tron is described in the vehicle-specific repair manual. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (A/C System Refrigerant Circuit, Cleaning).
- Condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately or is not available as a replacement part, the condenser must be replaced after flushing (with the dryer cartridge installed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA)
- After flushing, the refrigerant receiver on the heat exchanger for heat pump operation must be replaced. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit .
- The Refrigerant Shut-Off Valve V424- must be replaced after flushing. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit.



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Audi R8 (42_)

Vehicle	Required adapters for the connections to A/C compressor	Required adapters for the connections to the reservoir	Miscella- neous
Audi R8 (42_) from MY 2008	- Compressor manufacturer "Denso" (block connections with radial sealing) ◆ Low pressure by Side Perriguor dunies and Circuits Adapter Set 1 - Adapter 12 - VAS 6338/12- ◆ High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter Set 1 - Adapter 3 - VAS 6338/3-		part or in whole, is no or accept any liabil



Note

- The A/C compressor can only be removed when the engine is removed on the Audi R8. To flush the refrigerant circuit, the refrigerant lines can be removed when the A/C compressor is installed. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). With the A/C compressor installed the refrigerant oil quantity in the A/C compressor cannot be determined, for this reason flushing the refrigerant circuit with the A/C compressor installed would not be productive.
- Both installed condensers are flushed in opposite direction of the refrigerant flow direction.



Audi R8 (4S_)

cle Required adapters for the connections to A/C compressor	Vehicle
R8 – Compressor manufacturer "Denso" (block con-	Audi R8 (4S_) from MY 2015



- Depending on the engine, the A/C compressor can only be removed when the engine is removed on the Audi R8. To flush the refrigerant circuit, the refrigerant lines can be removed when the A/C compressor is installed. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 Refrigerant Circuit (vehicle-specific repair manual). With the A/C compressor installed the refrigerant oil quantity in the A/C compressor cannot be determined, for this reason flushing the refrigerant circuit with the A/C compressor installed would not be productive.
- Both installed condensers are flushed in opposite direction of the refrigerant flow direction.
- A short version of the filler hose is also included in the Refrigerant Circuits Adapter Set 1 - VAS 6338/1-.
- The receiver/dryer could potentially be flushed but it will take too much refrigerant because of its large internal volume; the receiver/dryer would ice-up too much when extracting the refrigerant, the refrigerant would evaporate too slowly and extraction would be prolonged too much.

Audi e-tron (GE_) from MY 2019, Audi Q8 e-tron (GE_) from MY 2024

	era ne co tecte mitte	equired adapt- s for the con- ections to A/C mpressor d by copyright. Copyin d unless authorised by respect to the correctne	for to the er /		Miscellane- ous ses, in part or in who e uarantee or accept ary nt. Copyright by AUD	
Audi e- tron (GE_) from MY 2019, Audi Q8 e- tron (GE_) from MY 2024	•	Compressor manufacturer "Sanden" (block connections with radial sealing) Low pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 79 - VAS 6338/79- High pressure side: Refrigerant Circuits Adapter Set 1 - Adapter 3 - VAS 6338/3-	- I	ceiver/Dryer No adapter re- quired, dryer is removed from receiver/dryer on condenser and the opening is sealed.	The expansion valve is removed and Refrigerant Circuits Adapter Set 1 - Adapter 44 - VAS 6338/44- is installed (or an old expansion valve is drilled on and installed as an adapter). Refer to ⇒ page 97 and the ⇒ Electronic Parts Catalog (ETKA).	

Vehicle	Required adapters for the connections to A/C compressor	Necessary adapter for the connections to the receiver/dry- er / for the check valves and shut-off valves	Miscellane- ous	
	Protected by copyright permitted unless authority with respect to the	orised by AUDI AG AUDI AG d	The shut-off valves installed for the check valves are opened or closed according to the area to art be flushed or he alies and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit.	or in whole, is accept any lia t by AUDI AG
		Shut-off valve Remove the Refrigerant Shut-Off Valve Refrigerant Shut-Off Valve - V424-and install a Shut-off Valve - VAS 6338/42-for it.	Then open or close the shut-off valve installed for the shut-off valve according to the area to be flushed. Replace the Refrigerant Shut-Off Valve - V424- after flushing.	



Refrigerant R134a Servicing - Edition 12.2022



Note

- The refrigerant circuit is cleaned in four steps (flushing cycles). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (Cleaning the A/C system refrigerant circuit).
- Not only do the installed shut-off valves have to be in the correct position (open or closed), but also the electric valves (in the valve block) have to be in the correct position so that the entire refrigerant circuit can be flushed. The activation of the electric valves takes place via different routines, which are stored in the respective control module (for example in the Thermal Management Control Module - J1024-). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (A/C System Refrigerant Circuit, Cleaning).
- To flush, the circuit is divided into multiple sections and then hole, is not cleaned during one flushing cycle at a time. The division takes place by activating the installed electrically activated valves and via the installed manually activated hand shut-off valves. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (A/C System Refrigerant Circuit, Cleaning) use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.
- The design of the different flushing circuits is described in the vehicle-specific repair manual. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (Cleaning the A/C system refrigerant circuit).
- Condensers with an integrated receiver/dryer or dryer cartridge that cannot be replaced separately or is not available as a replacement part, the condenser must be replaced after flushing (with the dryer cartridge installed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- After flushing, the refrigerant receiver on the heat exchanger for heat pump operation must be replaced. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit .
- The Refrigerant Shut-Off Valve V424- must be replaced after flushing. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit.

5.6 Refrigerant Circuit, Determining Leaks

⇒ "5.6.1 Refrigerant Circuit, Tracing Leaks Using Electronic Leak Detector (for example, V.A.G 1796)", page 188

⇒ "5.6.2 Leak Detection on Refrigerant Circuit Using Leak Detection System VAS 6201", page 190

⇒ "5.6.3 Finding Leaks via Vacuum Test using A/C Service Station or Nitrogen Pressure Testing", page 199



WARNING

There is a risk of freezing.

Refrigerant may leak out if the refrigerant circuit is not discharged.





- Minor leaks can be detected using an electronic leak detector or UV leak detector lamp.
- This repair manual describes two different methods for detecting leaks in the refrigerant circuit. These methods have been tested and result in success when used correctly under different operating conditions.
- Many methods for detecting leaks in the refrigerant circuit are offered in the open market. These methods do not always have clear results and if they are not performed exactly to the specification, they may indicate various refrigerant circuit components having leaks when they do not. Also, refrigerant circuit components can be damaged by some methods.
- Do not repair components with leaks; always replace them.
- Do not charge a leaking refrigerant circuit with refrigerant. Evacuate the circuit and check it for leaks before charging. Refer to Refer to \Rightarrow "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80



Caution

- Audi does not approve the use of chemicals (stop leak additives) to seal leaks in the refrigerant circuit.
- Chemicals that seal leaks form deposits in the refrigerant circuit that affect the function of the A/C system and lead to malfunctions in the A/C system and the A/C service station.



Note

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Chemical materials (leak stop additives) to seal leaks in the rea in this document. Copyright by AUDI AG. frigerant circuit react with air or the moisture in the surrounding air and form deposits in the refrigerant circuit (and in the A/C service station) that lead to malfunctions in the valves and other components that come into contact with such chemicals. These deposits cannot be removed completely from the components, even by flushing. It is only possible to service the refrigerant circuit by replacing all the components that have come into contact with this material.

5.6.1 Refrigerant Circuit, Tracing Leaks Using Electronic Leak Detector (for example, V.A.G 1796)



Note

- The various refrigerants have differing molecular compositions. The electronic leak detector sensors are set up to detect these molecules. If an electronic leak detector is used, which is not specifically designed to detect refrigerant R134a, it will not respond to the refrigerant R134a or will only do so when there is a larger concentration of R134a in the area of the leak.
- Depending on the version of the A/C unit, an evaporator leak can be determined either by holding the leak detector test probe over the glove compartment cooling connection in the A/C unit, or by holding the test probe on an open connection of a disconnected A/C condenser water drain.

Perform a leak detection test to locate the leak while the refrigerant circuit is completely empty:



Caution

To prevent more refrigerant than is necessary for the leak test from venting into the air, proceed as follows with the refrigerant circuit completely empty:

Evacuate the refrigerant circuit with the A/C service station. Refer to Refer to ⇒ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80.



Note

- If a larger leak is found during evacuation, find and it and repair it as described. Refer to Refer to ⇒ "5.3.4 Refrigerant" Circuit, Evacuating with A/C Service Station", page 80 .
- If no leak is found during evacuation or there is a leak that is so small that the location cannot be found with the vacuum test, proceed as follows.
- Fill the evacuated refrigerant circuit with approximately 100 grams of refrigerant and perform the leak test in the same way as for a refrigerant circuit that is filled with refrigerant. Refer to <u>⇒ page 188</u>.

Perform a leak detection test on a refrigerant circuit that is filled with refrigerant:

- On vehicles with a high-voltage system, switch off (deactivate) the "auxiliary climate control" function. Refer to the ⇒ Owner's Manual and ⇒ Infotainment/MMI Operating Man-
- Switch off the ignition.

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Start up the leak detector in line with relevant Operating III correctness of information in this document. Copyright by AUDI AG. structions.



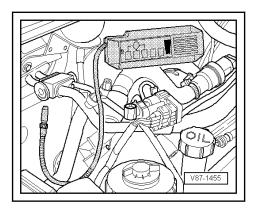
- Always hold the test probe underneath the suspected leak.

Depending on the model, leak detection is indicated by an increase in clicking rate or a warning tone (refer to operating instructions for leak detector).



Note

- Currents of air quickly disperse refrigerant gas. Drafts must therefore be avoided during leak detection.
- ♦ Refrigerant gas is heavier than air and will escape.





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5.6.2 Leak Detection on Refrigerant Circuit Using Leak Detection System VAS 6201

Note

- Certain leaks cannot or only with difficulty be found using an electric leak detection unit. Leak detection can be performed using Leak Detection Kit VAS 6201A.
- Refrigerant and refrigerant oil escape when there is a leak in the refrigerant circuit. Generally, this oil remains in the vicinity of the leaking area. A small amount of fluorescent fluid must be added into refrigerant circuit so that this oil becomes visible under UV light. This fluid (PAG oil with an additive that lights up under UV light) is added into the refrigerant circuit and distributes itself with the refrigerant oil when the A/C system is switched on.
- A/C system must be operated for a minimum of 60 minutes so that the additive distributes itself in the entire refrigerant circuit (compressor must be running). Depending on the size of the leak, it may become visible under UV light within that
- Refrigerant oil with additive that lights up under UV-light can be added directly with an open circuit or be pumped into a filled circuit via service connection on the low pressure side using the Leak Detection Kit - Hand Pump w/Cartridge VAS6201/1 (from Leak Detection Kit VAS 6201A).
- If the UV-leak detection additive is added to a filled refrigerant circuit via the service connection on the low pressure side, a small amount of it remains in the service connection. Carefully remove this residual amount so that a leaking area is not detected erroneously upon a later leak detection.
- If a component in which UV-leak detection additive has been added is being replaced on a circuit, thoroughly clean the connection areas to the other components after assembling the refrigerant circuit. The UV-leak detection additive residue may register erroneously as leaking areas during later leak detection.
- Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not Refrigerant oil as well as UV-leak detection additive get Into AG does not guarantee or accept any liability the service station when evacuating a refrigerant circuit m the in this document. Copyright by AUDI AG. refrigerant oil is separated from refrigerant in oil collector of service station and removed from the service station via the draining device. The refrigerant oil drained off must not be poured back in. It must be replaced with new refrigerant oil.
- If leak detection fluid was filled already in a refrigerant circuit for an earlier repair, note the following: only add new leak detection additive if the refrigerant oil will be replaced. If only a portion of refrigerant oil was replaced, only top-off with a corresponding amount of leak detection fluid as well. For example, if 100 ml of refrigerant oil was replaced in a vehicle with 250 ml, add only 1 ml (cm3) of UV-leak detection additive.
- Certain materials and their connections (for example, oxidation products on aluminum components, corrosion protection wax, etc.) also light up under UV-light.
- Depending on the version of the A/C service station, UV-leak detection additive can also be added directly at the top. Refer to the operating instructions that come with the A/C service station.



To prevent more refrigerant than is necessary for the leak test from venting into the air, proceed as follows with the refrigerant circuit completely empty:

Evacuate the refrigerant circuit with the A/C service station. Refer to Refer to ⇒ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80.



Note

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- If a larger reak is found during evacuation, find and repair it any liability as described. Refer to Refer to ⇒ 5.6.3 Finding Leaks via Vacuum Test using A/C Service Station or Nitrogen Pressure Testing", page 199 and Refer to ⇒ "5.3.4 Refrigerant" Circuit, Evacuating with A/C Service Station", page 80.
- The UV-leak detection additive can also be filled in a filled or open refrigerant circuit with the Leak Detection Kit - VAS 6201A- . Refer to <u>⇒ page 192</u> .

If no leak is found during evacuation or there is a leak that is so small that the location cannot be found when evacuating, proceed as follows.

- Add the UV-leak detection additive using the A/C service station to the refrigerant circuit. Refer to ⇒ page 191.
- Add UV-leak detection additive using the Leak Detection Kit VAS 6201- in the refrigerant circuit. Refer to ⇒ page 192.

Adding the UV-leak detection additive to the refrigerant circuit using the A/C service station

Add the UV-leak detection additive and the prescribed refrigerant amount using the A/C Service Station to the refrigerant circuit. Refer to Refer to ⇒ "10.1 Refrigerant R134a Capaci-<u>ties", page 318</u> .



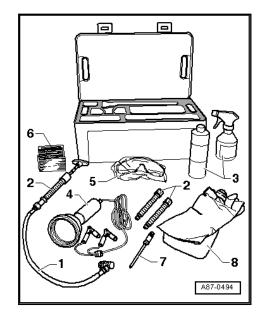
Note

Add 2.5 ± 0.5 cm³ of UV-leak detection additive for a refrigerant circuit with a refrigerant capacity of 100 to 150 cm 3 with the Leak Detection Kit - VAS 6201- for the Leak Detection Kit - VAS 6201- . If the refrigerant oil capacity in the refrigerant circuit is larger, then more UV-leak detection additive must be added accordingly (for example, 5.0 ± 0.5 cm³ for a refrigerant circuit with a refrigerant oil capacity of 250 cm 3. When adding the UV-leak detection additive using the A/C service station, consult the corresponding Owner's Manual as the required amount may vary. The relevant refrigerant oil quantities in the refrigerant circuit. Refer to Refer to ⇒ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities", page 360.

Special tools and workshop equipment required

- A/C service station with the option for adding the UV-leak detection additive to the refrigerant circuit. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).
- Approved leak detection additive. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).

Leak Detection Kit - Cleaning Solution - VAS 6201/3- -3-



- UV-Leak Detection Lamp VAS 6201/4A- -4-
- Leak Detection Kit Eye Protection VAS 6201/6- -5-
- Leak Detection Kit Label VAS 6201/7 - 6-
- Apply a label near the service connection stating that UVleak detection additive was added to the refrigerant circuit.
- Start the A/C system.



Note

- A/C system must be operated for a minimum of 60 minutes is not so that the additive distributes itself in the entire refrigerant G circuit (compressor must be running). Depending on the size of the leak, it may become visible under UV light within that
- Depending on the size and location of the leak, it can now last up to several days until enough refrigerant oil with UV leak detection additive flows out to clearly determine the leaking area.
- Find the leak in the refrigerant circuit with the UV lamp VAS 6196/4. Refer to <u>⇒ page 198</u>.

Add UV-leak detection additive using the Leak Detection Kit -VAS 6201- in the refrigerant circuit.

Special tools and workshop equipment required

◆ Leak Detection Kit - VAS 6201A-



Leak Detection Kit VAS 6201A contains the following tools. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).

- Leak Detection Kit Hand Pump w/Cartridge VAS 6201/1-
- 2 -Leak Detection Kit - Cartridge - VAS 6201/2- (with UV leak detection additive)
- 3 -Leak Detection Kit - Cleaning Solution - VAS 6201/3-
- 4 -UV-leak Detection Lamp - VAS 6201/4A-
- Leak Detection Kit Eye Protection VAS 6201/6-5 -
- 6 -Leak Detection Kit - Sticker - VAS 6201/7-
- 7 -Leak Detection Kit - Filler Tube VAS 6201/8
- Leak Detection Kit Hand Protection VAS 6201/9-



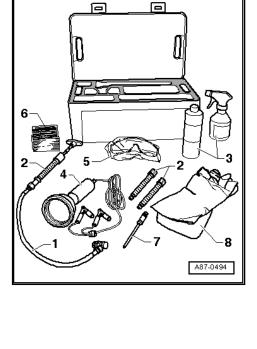
Note

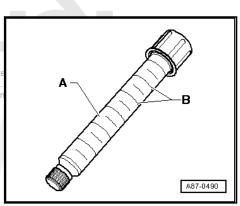
- Instructions for how to pour the UV-leak detection additive into the refrigerant circuit using the Leak Detection Kit - VAS 6201A- are given in the following. If the UV-leak detection additive is added to the refrigerant circuit with the help of other tools (for example, with the A/C service station) read the applicable operating instructions.
- The following is the specified amount of UV-leak detection additive that is to be added to a refrigerant circuit with a refrigerant oil quantity of 100 to 150cm 3 using the Leak Detection Kit - VAS 6201A- (2.5 ± 0.5 cm³). If the refrigerant oil capacity in the refrigerant circuit is larger, then more UV-leak detection additive must be added accordingly (for example, 5.0 ± 0.5 cm³ for a refrigerant circuit with a refrigerant oil capacity of 250 cm ³. For the relevant refrigerant oil quantities in the refrigerant circuit. Refer to Refer to ⇒ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities'
- If the UV-leak detection additive is added to the refrigerant circuit with the help of other tools (for example, with the A/C service station), observe the prescribed quantities of UV-leak detection additive given in the corresponding operating instructions.

Adding UV-leak detection additive when the refrigerant circuit is empty

The cartridge -A- contains 15.4 ml of UV-leak detection additive (one unit -B- corresponds to 2.5 ml). Protected by copyright. Copying for priva

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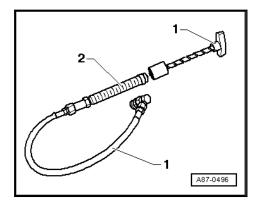




- Assemble the Leak Detection Kit VAS 6201A- item -1- with the Leak Detection Kit - Cartridge -VAS 6201/2- item -2-.
- Insert the Leak Detection Kit Filler Tube VAS 6201/8- (≥ page 193 item -7-) into the hand pump.
- Open the hand pump service valve.



- UV-leak detection additive is best added to the empty refrigerant circuit via a service connection or an opened connec-
- If the refrigerant circuit is empty, then it is better to add the UV-leak detection additive via a connection point (for example, when the connection point is already open). This way no UV-leak detection additive remains in the service connection and the connection does not need to cleaned.
- Add the UV-leak detection additive to the refrigerant circuit via a service connection. Refer to ⇒ page 196.
- Add the UV-leak detection additive to the refrigerant circuit via an opened connection. Refer to <u>⇒ page 195</u>.





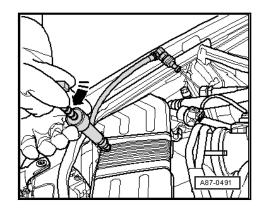
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Add the UV-leak detection additive to the refrigerant circuit via an opened connection.

- Open an easily accessible connection point on refrigerant
- Cover the area around connection point with foil or absorbent paper.
- Hold the tube upwards.
- Tighten the hand pump handle just enough until the UV-leak detection additive comes out of the tube.
- Add 2.5 ± 0.5 ml (Milliliter = cm³) of UV-leak detection additive to the refrigerant circuit (for a refrigerant circuit with a refrigerant oil capacity from 100 to 150 cm³).





Note

If UV-leak detection fluid was filled already in a refrigerant circuit for an earlier repair, note the following: only add new UV-leak detection additive if the refrigerant oil will be replaced. If only a portion of the refrigerant oil was replaced, only add a proportionate amount of the UV leak detection additive. For example, if 100 ml of refrigerant oil was replaced in a vehicle with 250 ml, add only 2 ml (cm³) of UV-leak detection additive.

- Replace the O-ring seal at the opened connection point.
- Assemble the refrigerant circuit
- Apply a label near the service connection stating that leak detection fluid was added to the refrigerant circuit.
- Evacuate and fill the refrigerant circuit according to specification. Refer to Refer to ⇒ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80 and Refer to ⇒ <u>5.3.5 Refrigerant Circuit, Charging with A/C Service Sta-</u> tion", page 84
- Start the A/C system.



Note

- A/C system must be operated for a minimum of 60 minutes so that the additive distributes itself in the entire refrigerant circuit (compressor must be running). Depending on the size of the leak, it may become visible under UV light within that
- Depending on the size and location of the leak, it can now last up to several days until enough refrigerant oil with additive flows out to definitely determine the leaking area.
- Find the leak in the refrigerant circuit with the UV lamp VAS 6196/4. Refer to ⇒ page 198
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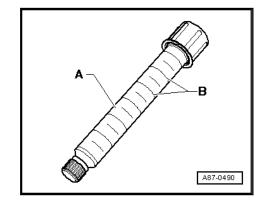
Adding UV-leak detection additive when the refrigerant circuit is



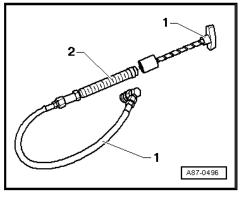
Note

- If leak detection fluid was filled already in a refrigerant circuit for an earlier repair, note the following: only add new leak detection additive if the refrigerant oil will be replaced. If only a portion of refrigerant oil was replaced, only top-off with a corresponding amount of leak detection fluid as well. For example, if 100 ml of refrigerant oil was replaced in a vehicle with 250 ml, add only 1 ml (cm³) of UV-leak detection addi-
- A small quantity of UV-leak detection additive remains in the service connection. Carefully remove this residual amount so a leaking area is not detected erroneously upon a later leak detection.

The cartridge -A- contains 15.4 ml of UV-leak detection additive (one unit -B- corresponds to 2.5 ml).



- Switch off the ignition.
- pRemove the closure cap from service connection of low liability pressure side in refrigerant circuit is document. Copyright by AUDI AG.
- Assemble the Leak Detection Kit VAS 6201A- item -1- with the Leak Detection Kit - Cartridge -VAS 6201/2- item -2-.
- Insert Leak Detection Kit Filler Tube VAS 6201/8- (Refer to \Rightarrow page 193 item -7-.) into the service coupling and open the service coupling by screwing in the hand wheel. Hold the hose upward and tighten the handle of the hand pump just enough until the UV-leak detection additive starts to emerge from the tube.





Note

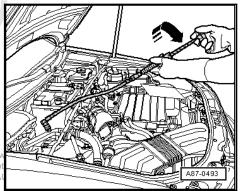
Make sure the hand pump hose is completely filled with refriger-

Close the service coupling and remove tube from the retain-



- Cover the area around the service connection on the vehicle with foil or absorbent paper.
- Connect the filler device to the refrigerant circuit service connection on the vehicle.
- Open the service connection by screwing in the hand wheel.
- Turn the hand pump handle to add 2.5 \pm 0.5 ml (Milliliter= cm³) UV-leak detection additive to the refrigerant circuit (for a refrigerant circuit with a refrigerant oil quantity from 100 to 150 cm³).

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- Remove the filling device from the service connection.
- Remove the rest of the UV-leak detection additive from the service connection, for example using absorbent paper.
- Seal the service connection with the closure cap.
- If necessary, clean the area around service connection using cleaning solution.
- Apply a label near the service connection stating that leak detection fluid was added to the refrigerant circuit.
- Start the A/C system.



- A/C system must be operated for a minimum of 60 minutes so that the additive distributes itself in the entire refrigerant circuit (compressor must be running). Depending on the size of the leak, it may become visible under UV light within that time.
- Depending on the size and location of the leak, it can now last up to several days until enough refrigerant oil with additive flows out to definitely determine the leaking area.
- Find the leak in the refrigerant circuit with the UV lamp VAS 6196/4. Refer to <u>⇒ page 198</u>.

Detecting leaks on the refrigerant circuit using UV lamp VAS 6196/4



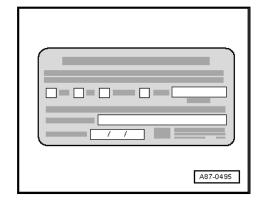
WARNING

Do not look into the UV lamp.

Do not direct the UV lamp at other people.



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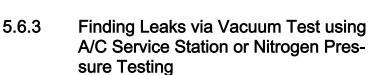






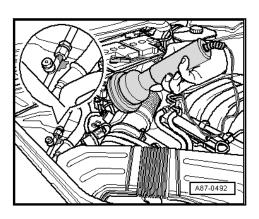
- After adding the UV-leak detection additive, the A/C system must be operated for a minimum of 60 minutes so that the additive distributes itself in the entire refrigerant circuit (compressor must be running). Depending on the size of the leak, it may become visible under UV light within that time.
- ◆ Depending on the size and location of the leak, it can now last up to several days until enough refrigerant oil with additive flows out to determine definitely the leaking area.
- With leaks on the evaporator, leak detection additive is possibly washed off with condensation and flows out via the condensation water drain. Since the evaporator is not easily accessible on most vehicles, checking the evaporator drain may indicate if the evaporator is leaking. However, it is necessary for this purpose that leak detection additive has already been in the refrigerant circuit for a long period of time (for example, a few days).
- The protective goggles do not only serve as eye protection but also amplify the illumination of leak detection additive under UV light.
- Depending on the accessibility of different components in the refrigerant circuit, it may be necessary to remove some vehicle components such as the bumper or air filter.
- Only a little refrigerant oil will get onto certain places on the refrigerant circuit when A/C is being used (for example, on the top cover of the receiver/dryer attached to the condenser on an Audi A8 from MY 2010). If there is a leak at this spot, it may take longer until enough refrigerant with refrigerant oil and additive start to leak out, which then can be viewed under UV light. It may be useful to use an electronic leak detector at these locations to find a leak. Refer to Refer to Description of the state of the

- Move vehicle into a slightly darker area of the workshop (with daylight or bright lighting the effect of the UV light is diminished).
- Check the accessibility of the various components in the refrigerant circuit and remove any components in the area that block access to the refrigerant circuit such as noise insulation and the bumper.
- Wear protective eyewear to protect the eyes.
- Connect the UV-lamp to a 12 volt battery (vehicle battery). Observe the correct polarity of connections.
- Switch on the UV lamp and illuminate the components of refrigerant circuit. Locations where refrigerant, refrigerant oil and UV leak detection additive has leaked out light up under fluorescent UV light.



Vehicles with a high-voltage system (hybrid vehicles)

On vehicles with a high-voltage system, switch off (deactivate) the "auxiliary climate control" function. Refer to the



Αυδι

⇒ Owner's Manual and ⇒ Infotainment/MMI Operating Manual.

All Vehicles

- Switch off the ignition.
- Finding leaks via the vacuum test using the A/C service station or nitrogen pressure testing. Refer to Refer to ≥ 5.3.4 Refrigerant Circuit, Evacuating with A/C Service Sta-<u>tion", page 80</u>



Note

- Small leaks (less than 100 g (3.5 oz) of refrigerant loss per year) are not often detected with the vacuum test or with the nitrogen pressure test. The incoming air and the amount of nitrogen flowing out is too small to be able to locate the faulty location based on noise.
- Leaks on the refrigerant circuit that are greater than 100 g (3.5 oz) of refrigerant loss each year are also not always detectable with the vacuum test or with the nitrogen pressure test, depending on the ambient conditions (ambient noise, leak location etc.). The incoming air and/or the amount of nitrogen flowing out may be too small to generate any noise that would indicate a faulty location.
- Depending on the ambient conditions, larger refrigerant circuit leaks (such as stone impact to the condenser with a refrigerant loss greater than 100 g (3.5 oz) per day) can be detected, for example, by noises that are produced during the vacuum test or the nitrogen pressure testing at the faulty location. Refer to Refer to ⇒ "5.3.4 Refrigerant Circuit, Evacuating with A/C Service Station", page 80.



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6 Refrigerant Circuit Complaints

⇒ "6.1 Possible Refrigerant Circuit Concerns", page 201

6.1 Possible Refrigerant Circuit Concerns

⇒ "6.1.1 Test Prerequisites", page 201

⇒ "6.1.2 Possible Complaints", page 201

6.1.1 **Test Prerequisites**

- Fault finding on the electrical equipment, vacuum system and air duct has not revealed any faults. Refer to ⇒ Guided Fault Finding for the A/C system ("OBD" or "Guided Fault Finding for the A/C system"), ⇒ Wiring diagrams, Trouble-shooting & Component locations and ⇒ Heating, Ventilation and Air Conditioning or ⇒ A/C System.
- The OBD/Guided Fault Finding for the A/C System with ⇒ Vehicle Diagnostic Tester cannot detect a fault, the A/C compressor shut off condition is not displayed in the measured values block (only on vehicles with OBD "A/C System") ⇒ Heating, Ventilation and Air Conditioning or ⇒ A/C System or "Guided Fault Finding" ⇒ Vehicle Diagnostic Tester.

6.1.2 Possible Complaints



Note

- All complaints marked with *. Refer to ⇒ "8 Pressures Checking", page 208 "Checking pressures".
- If a malfunction occurs at only one evaporator in vehicles niee or accept any liability with two evaporators, also check the pressures in the refriguight by AUDI AG. erant circuit.
- Observe the test requirements. Refer to ⇒ "6.1.1 Test Pre-<u>requisites", page 201</u> .

Vehicles without High-Voltage System

- Total cooling system failure.*
- Insufficient cooling output at all vehicles speeds or engine speeds.*
- None or insufficient cooling after driving a few miles. *
- No or insufficient cooling at one or both evaporators (for vehicles with two A/C units).
- The A/C compressor, A/C Clutch N25- or A/C Compressor Regulator Valve - N280- are shut off by a pressure switch (for example, A/C Refrigerant Low Pressure Switch -F73-, Magnetic Clutch High Pressure Switch -F118-, A/C Pressure Switch -F129- or by the Front A/C Display Control Head -E87- or Climatronic Control Module - J255-) due to excessive or inadequate pressure. * Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- None or sharp decrease in fresh-air supply after driving several miles (evaporator iced up). *

Vehicles with High-Voltage System

◆ Total cooling system failure.*

- Insufficient cooling output at all vehicles speeds or A/C compressor speeds.3
- None or insufficient cooling after driving a few miles. *
- No or insufficient cooling in the evaporator or on a heat exchanger (for example on the high-voltage battery heat exchanger). * Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- No or insufficient heating output at the heat exchanger for the heat pump operation (for example on the Audi Q7 etron)*. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- The Electrical A/C Compressor V470- is switched off by a control module (for example Front A/C Display Control Head - E87-, Climatronic Control Module - J255- or Thermal Management Control Module - J1024-) due to excessive or inadequate pressure. * Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function
- None or sharp decrease in fresh-air supply after driving several miles (evaporator iced up). *

All Vehicles

From these, the following complaints may also occur:

The A/C compressor makes noises

Tighten the compressor securing bolts and compressor bracket using a torque wrench.

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Noise (refrigerant hammer) occurring immediately after switching on air conditioner and/or when cornering or braking

Discharge, evacuate and charge refrigerant circuit (too much refrigerant in circuit).



Note

Too much refrigerant oil in the circuit could also cause this problem. This could occur if the amount of refrigerant oil was not adjusted when replacing the A/C compressor.

Water sprays out of vents (in dash panel or footwell) although air conditioning system is otherwise functioning properly:

- Check proper routing of condensate drain; it must not be crushed or kinked.
- Check condensation drain valve, it must not be clogged by wax or underbody sealant and must close properly.
- Check the plenum chamber cover; it must not be damaged and must be properly installed (to stop water running into evaporator).
- Check the water drains in plenum chamber; they must not be blocked (for example, by leaves).



7 A/C Service Station, Connecting

- ⇒ "7.1 Service Station, Connecting on Vehicles with Connections on Low and High Pressure Side of Refrigerant Circuit",
- ⇒ "7.2 Service Station, Connecting on Vehicles with No Connection on Low and High Pressure Side of Refrigerant Circuit",
- If work on the high-voltage system components is necessary, de-energize the high-voltage system. Refer to ⇒ Rep. Gr. 93 ; High-Voltage System, De-Energizing or ⇒ Electrical Equipment; Rep. Gr. 93; High-Voltage System, De-Energizing.



Note

Working on the refrigerant circuit with the A/C service station can normally be performed without needing to de-energize the high-voltage system.

- Switch off the ignition.
- 7.1 Service Station, Connecting on Vehicles with Connections on Low and High Pressure Side of Refrigerant Cir-

A/C Service Station, Connecting for Measuring and Testing

- Switch off the ignition.
- Connect the A/C service station to the power supply.
- Connect the quick-release coupling adapter to the charging hoses of the A/C service station (hand wheels not screwed in/hand shut-off valve not open).
- Protect Switch on the A/C service station and evacuate the charging with hoses (only necessary if there is air in charging hoses).
 - Switch on the A/C service station.
 - Remove the caps from the service connections (with valve).
 - Connect the service station via the service connections with the quick-release coupling adapters to the vehicle refrigerant circuit.
 - Screw in the handwheel of the quick-release coupling adapters only until the valves are definitely open at the refrigerant circuit connection (observe pressure gauge, do not strain valves).

Vehicles with High-Voltage System and A/C System Additional Functions (for Example on Audi Q7 e-tron):



Note

For vehicles with the "heat pump" function and/or "high-voltage battery cooling", high pressure is not at the high pressure side service connection in every A/C system operating condition. Depending on the A/C system operating condition, the refrigerant circuit pressure on the high pressure side can only be measured via the pressure / temperature sensor installed in the refrigerant circuit on these vehicles. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

To check the different functions of these A/C systems

- Select the respective function ("cooling the vehicle interior", "heat pump operation" or "cooling the high-voltage battery") using the ⇒ Vehicle diagnostic tester and perform it according to the specifications using the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.
- Select and read out the measured values of the different pressure/temperature sensors installed in the refrigerant circuit. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

All Vehicles

- Perform the planned tests and measurements.
- 7.2 Service Station, Connecting on Vehicles with No Connection on Low and High Pressure Side of Refrigerant Circuit
- 7.2.1 Service Station, Connecting with A/C Adapter Set A.G 1786 to Refrigerant Circuit", page 205
- 7.2.2 Service Station, Connecting with Adapter V.A.G 1785/10 to Refrigerant Circuit", page 206
- "7.2.3 A/C Service Station, Connecting for Measuring and Testing", page 206

On the following vehicles, no service connection is provided for the service station on the low-pressure side of the refrigerant circuit; adapters must be used to connect the service station to the refrigerant circuit on these vehicles:

- Audi 80, Audi Cabrio, Audi Coupe
- Audi A4 through 07/1996
- Audi 100/ Audi A6 through 03/1997
- Audi A8 through 11/1997

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For vehicles with no or an inaccessible connection on the A/C compressor, remove the A/C Refrigerant Low Pressure Switch -F73- (bridge the terminals in connector to A/C Refrigerant Low Pressure Switch - F73-) and install the adapter to this connection. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



Note

- The tools listed below are commercially available or can be obtained from local distributor or importer.
- Should it be necessary to measure the pressures at the switch connections on the high-pressure side, use the adapter A/C Adapter Set - Adapter 9 - V.A.G 1785/9- and proceed in the same manner.

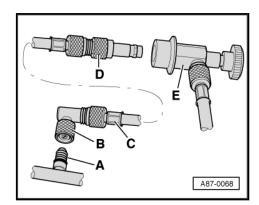
7.2.1 Service Station, Connecting with A/C Adapter Set - V.A.G 1786- to Refrigerant Circuit

- A Connection with valve (small valve insert) on low-pressure side of refrigerant circuit
- B A/C Adapter Set Adapter 1 V.A.G 1786/1-.
- C Commercially available charging hose (short version with 5/8" thread on both sides).
- D A/C Adapter Set Adapter 2 V.A.G 1786/2- (for connection of quick-release coupling of service station -E-).



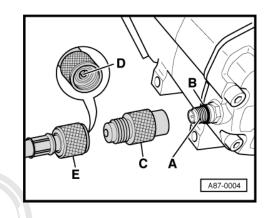
Note

- Assemble the adapter and charging hose as shown and connect to connection with valve -A- first.
- The A/C Adapter Set Adapter 1 V.A.G 1786/1- may only to be used on connections with a "small" valve insert (standard for connection with valve for A/C Refrigerant Low Pressure Switch F73- and from 10/1994 also introduced not gradually: on the A/C compressor) Joes not guarantee or accept any liability
- Instead of the A/C Adapter Set Adapter 1 V.A.G 1786/1the A/C Adapter Set - Adapter 10 - V.A.G 1785/10- can also be used (remove valve from A/C Adapter Set - Adapter 10 -V.A.G 1785/10 - or install valve opener in filler hose).



7.2.2 Service Station, Connecting with Adapter V.A.G 1785/10 to Refrigerant Circuit

- Remove the cap from the connection with valve -A- (at A/C compressor).
- Attach the O-ring -B- to the connection (8.9 mm; 1.8 mm).
- Screw the A/C Adapter Set Adapter 10 V.A.G 1785/10 -Conto the connection -A-.
- Install the valve opener -D- with the appropriate seal in the charging hose connection.





Note

- The type of valve opener -D- and seals required depends on charging hose used (specific to manufacturer).
- The quick-release coupling adapter is not required for connection on the low-pressure side of Audi vehicles.
- Screw the charging hose -E- (to the service station) onto the A/C Adapter Set - Adapter 10 - V.A.G 1785/10- .

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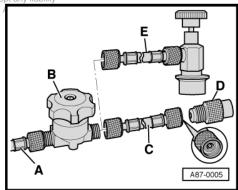
Note

To minimize the amount of air and moisture penetrating into the charging hoses and thus into the refrigerant circuit, the charging hoses should be connected together as shown.

- A Filler Hose to A/C Service Station
- B Manual Shut-Off Valve
- C Charging Hose (short version) with Valve Opener for Connection to Adapter -D-
- D A/C Adapter Set Adapter 10 V.A.G 1785/10-
- E Filler hose (short version) with quick-release coupling adapter (for vehicles with quick-release coupling adapter on low-pressure side).
- Perform the planned tests and measurements.

7.2.3 A/C Service Station, Connecting for Measuring and Testing

- On vehicles with a high-voltage system, switch off (deactivate) the "auxiliary climate control" function. Refer to the ⇒ Owner's Manual and ⇒ Infotainment/MMI Operating Man-
- Switch off the ignition.
- Connect the A/C service station to the power supply.
- Assemble the adapter set and screw to connection on lowpressure side.
- Connect the quick-release coupling adapter to the charging hoses of the A/C service station (hand wheels not screwed in/hand shut-off valve not open).





- Switch on the service station and evacuate the charging hoses (only necessary if there is air in charging hoses).
- Switch off the service station.
- Remove the cap from the service connection or connection with valve (or remove low-pressure switch and bridge respective electrical connections).
- Connect the service station via the service connections with the quick-release coupling adapters to the vehicle refrigerant circuit.
- Install the hand wheel on the guick-release coupling adapters only until valve is definitely open at refrigerant circuit connection (observe pressure gauge, do not strain the valve).
- Perform the planned tests and measurements.



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8 Pressures, Checking

- ⇒ "8.1 Refrigerant Circuit, Checking Pressure with Service Station", page 208
- ⇒ "8.2 Pressures, Checking, Vehicles with Restrictor and Reservoir, Internally Regulated A/C Compressor", page 214
- ⇒ "8.3 Pressures, Checking, Vehicles with Expansion Valve and Receiver/Dryer, Internally Regulated A/C Compressor", page
- ⇒ "8.4 Pressures, Checking, Vehicles with Restrictor, Reservoir and A/C Compressor Regulator Valve N280, Externally Regulated A/C Compressor", page 226
- ⇒ "8.5 Pressures, Checking, Vehicles with Expansion Valve, Receiver/Dryer and A/C Compressor Regulator Valve N280, Externally Regulated Compressor", page 235
- ⇒ "8.6 Pressures, Checking, Vehicles with Electrically Driven A/C Compressor (Vehicles with High-Voltage System)", page

8.1 Refrigerant Circuit, Checking Pressure with Service Station

- ⇒ "8.1.1 Test Requirements", page 209
- ⇒ "8.1.2 Pressures, Checking", page 211



Note

- All test conditions marked * are vehicle-specific and are described in the Repair Manual for the relevant vehicle.
- Check the cooling output *.
- Protected by copyright. Copyring for private or commercial purposes, in part or in whole, is not Connections with valve and service connections for meas. AG. AUDI AG does not guarantee or accept any liability urement and testing. Refer to ⇒ Heating, Veritilation and Air mation in this document. Copyright by AUDI AG. Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Depending on the A/C compressor version, there may be a valve installed on the high pressure side of the A/C compressor, which prevents the liquid refrigerant from flowing back into the A/C compressor once the A/C system is turned off. If an A/C compressor with this valve is installed in a vehicle with a refrigerant circuit having an expansion valve, then it may take some time until the pressure in the high pressure side decreases (the expansion valve is cold and the pressure in the low pressure side quickly increases after it is turned off, the expansion valve closes and the refrigerant can flow slowly to the low pressure side). If the A/C compressor is switched on, the pressure on the low pressure side decreases, the expansion valve opens and the refrigerant can flow to the low pressure side.

Under certain operating conditions, residual moisture in refrigerant circuit can lead to an ice build-up at compressor regulator valve. This ice build-up interferes with A/C compressor regulation. The evaporator is cooled too intensely and freezes. The freeze-up of the evaporator can be the cause for the following customer complaints:

After a long drive, A/C system repeatedly or sporadically fails (no cooling or heating performance). After switching off the vehicle and after a short time, A/C function is OK again.



After a long drive, windows (front, side and rear windows) fog up from inside, windows are also not cleared by then pressing the <code>Defrost</code> button, after switching off vehicle and after a short time, A/C function is OK again.

Corrective Measure:

- On vehicles from MY 2001 equipped with a compressor with A/C Compressor Regulator Valve - N280-, check measured value of evaporator outflow temperature Evaporator Vent Temperature Sensor - G263- (via function "Read measuring value block"). If the sensor measured value is too low under the operating conditions described by the customer (at an ambient temperature above 0 °C (32 °F), longer when it is lower than 0 °C (32 °F) although the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280is not currently activated) or too high (above 10 °C (50 °F) even though the A/C system is working correctly). Can ice up due to the incorrect evaporator measured value. Use the ⇒ Vehicle Diagnostic Tester ("OBD" or "Guided Fault Finding for the A/C system" function) and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- If the vehicle does not have an Evaporator Vent Temperature Sensor - G263red check the yent temperature via of or ses, in part or in whole, is not example, the Footwell-Vent-Temperature Sensor 4 @1924 at the or accept any liability the "Lo temperature" for the driver and passenger side, 4t. Copyright by AUDI AG. or 5 bars for fresh air blower speed, air outlet in footwell and fresh air operation under operating conditions specified by customer. If the sensor measured value is too low (at ambient temperature above 0 °C (32 °F), colder than 0 °C for a long period of time).
- Check the refrigerant line from the evaporator to the reservoir (thick tube, low pressure side) with the engine running. If this line is thickly iced-up when complaint occurs (a thin layer of ice is permitted), this also indicates that the temperature in the evaporator is too low.
- Discharge the refrigerant circuit, replace the reservoir or the receiver/dryer with dryer and evacuate the refrigerant circuit for a minimum of three hours.

8.1.1 **Test Requirements**



Note

The following are the test requirements for a vehicle with a mechanically driven A/C compressor as an example. On vehicles with a high-voltage system (for example Audi A3 e-tron, Audi Q7 e-tron etc.) and / or the additional A/C functions (for example Audi Q7 é-tron) this arrangement varies. For thèse vehicles, pay attention to the specifications in the respective repair manual and Guided Fault Finding. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking (vehicle-specific repair manual) and use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

- Radiator and condenser are clean (clean if necessary).
- The thermal insulation at expansion valve is OK and properly installed.*
- Ribbed belt is OK and properly tensioned. Ribbed belt for A/C compressor and generator are OK and correctly ten-
- All air ducts, covers and seals are OK and properly installed.

- Fault finding on the electrical equipment and vacuum system found no malfunction.* Use the ⇒ Vehicle Diagnostic Tester "OBD" function or "Guided Fault Finding" for the A/C system) and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- The A/C system OBD does not detect any malfunctions (when the engine is running and the A/C system is switched on), and no compressor shut-off condition is displayed in the measured value block (only for vehicles with "A/C system" OBD). Use the > Vehicle Diagnostic Tester ("OBD" function or "Guided Fault Finding" for the A/C system) and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual)
- The various pressure/temperature sensors installed on or in the refrigerant circuit provide valid measured values when the A/C system is being used. To check, use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System . If no errors can be detected, evacuate the refrigerant.
- Air flow through dust and pollen filter not obstructed by dirt*
- The A/C unit not drawing in secondary air at maximum fresh air blower speed* Evaporator and heater not drawing in secondary air at maximum fresh-air blower speed*
- Air guide doors in the A/C unit, heater, and evaporator, reach private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability their end position* with respect to the correctness of information in this document. Copyright by AUDI AG.
- Fresh-air intake ducts beneath hood and in passenger compartment as well as corresponding water drain valves OK*. Refer to ⇒ Heating, Ventilation, Air Conditioning; Rep. Gr. 87; Air Routing (vehicle-specific repair manual).
- The engine is warm.
- Vehicle is not exposed to direct sunlight. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Checking Cooling Output (vehicle-specific repair manual).
- The ambient temperature is greater than 15 °C (59 °F).
- All instrument panel vents are open.
- Start the engine.

Settings on the A/C system control module, for example on the Front A/C Display Control Head - E87- or the Climatronic Control Module - J255- (and Rear A/C Display Control Head -E265- for vehicles with two A/C units):

- Preselect "Auto" mode (A/C compressor on).
- Set temperature preset to "LO" on the driver and front passenger side (and the rear passenger compartment, left and right side in vehicles with two A/C units).

Setting on heater controls:

- Press A/C button and rec- or recirculation button.
- Turn temperature knob towards "cold" stop.
- Set the fresh-air blower dial to position "4".

The following system test conditions should be met:

One or more Radiator Fan - V7- (Radiator Fan 2 - V177-) operated (at least speed 1)*





For some versions, the fan is switched on only once the pressure in refrigerant circuit has exceeded a specified value.

- Fresh Air Blower V2- (and Rear Fresh Air Blower V80- in vehicles with two A/C units) running at maximum speed.
- Recirculated/fresh air door set to "Recirculated air mode" (within one minute, after starting vehicle, air-flow door is closed and recirculated-air door is opened)*
- The coolant shut-off valve is closed.
- The valves of pump valve unit are closed and there is no coolant circulation pump delivery.*
- Compressor is actually driven (A/C Clutch N25- operated, overload safeguard (if installed) not tripped).*



8.1.2

Note

The A/C compressor is driven by different components depending on the engine (belt or input shaft). The belt pulley or the drive unit has an overload protection to protect these components and the engine, which activates if the A/C compressor runs with resistance. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual).

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- Observe the test requirements. Refer to <u>⇒ "8.1.1 Test Re-</u> quirements", page 209
- On vehicles with a high-voltage system, switch off (deactivate) the "auxiliary climate control" function. Refer to the ⇒ Owner's Manual and ⇒ Infotainment/MMI Operating Manual.
- Switch off the ignition.
- Connect the A/C service station. Refer to ⇒ "7 A/C Service" Station, Connecting", page 203.

Vehicles with an electric operated valves in the refrigerant circuit, which cannot be opened without power (for example the Audi Q7 e-tron):



Note

For vehicles with a high-voltage system and additional A/C system functions ("heat pump operation" or "cooling the highvoltage battery"), valves may be installed in the refrigerant circuit that cannot be opened without current. These valves are opened and closed via stepper motors, for example, and are no longer activated after switching off the ignition. To check the pressures in the refrigerant circuit with the A/C system switched off, no areas may be closed, therefore the valves must be opened before this procedure. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual) and use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

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Open the electrically activated valves (not open without current) using the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

All Vehicles

- Take the pressure gauge readings (two possible results):
- Pressure in refrigerant circuit lower than indicated in table
- Pressure in refrigerant circuit in line with table or higher

Ambient temperature (in de- grees Celsius)	Pressure in refrigerant circuit in bar positive pressure
+15 °C (59 °F)	3.9
+20 °C (68 °F)	4.7
+25 °C (77 °F)	5.6
+30 °C (86 °F)	6.7
+35 °C (95 °F)	7.8
+40 °C (104 °F)	9.1
+45 °C (113 °F)	10.5



Note

- The temperature of the refrigerant circuit components should be equal to the ambient temperature. Pressure will deviate from the values in table if individual components of the rehole, is not frigerant circuit are warmer or colder. this document. Copyright by AUDI AG
- At absolute pressure, 0 bar (0 psi) corresponds to absolute vacuum. Normal ambient pressure (positive pressure) corresponds to 1 bar (14.5 psi) absolute pressure. 0 pressure corresponds to an absolute pressure of one bar on most pressure gauges (indicated by -1 bar (-14.5 psi) below 0).
- For vehicles with a High Pressure Sensor G65-, Refrigerant Circuit Pressure Sensor - G805- or A/C Pressure/Temperature Sensor - G395- etc., for which the measured pressure is displayed in measured value block, the measured pressure should match the values in the table. Use the ⇒ Vehicle Diagnostic Tester ("OBD" function or "Guided" Fault Finding "for the A/C system). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Pressure is measured in different units: 1 MPa (mega Pascal) corresponds to 10 bar (145.04 psi) positive pressure or 145 psi. 1 bar (14.5 psi) absolute pressure corresponds to 0 bar (0 psi) positive pressure and thus to the ambient pressure (atmospheric pressure).

Pressure in refrigerant circuit lower than indicated in table

Not enough refrigerant in refrigerant circuit.

- Determine refrigerant circuit leaks. Refer to ⇒ "5.6 Refrigerant Circuit, Determining Leaks", page 186.
- Check the pressure relief valve.

If pressure relief valve has responded:

- Check the radiator fan activation.
- Check the refrigerant pipes and hoses for cross-section constrictions caused by inadequate bending radii.
- Check the refrigerant pipes and hoses for external damage.



If no error is detected, clean the refrigerant circuit (by flushing with refrigerant R134a, refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a page 93; or clean using compressed air and nitrogen, refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).

Pressure in refrigerant circuit in line with table or higher

- Start the engine or activate the ready mode (for example on vehicles with a high-voltage system).
- Set the A/C system to maximum cooling output.



Note

- For vehicles with A/C Compressor Regulator Valve N280the control current can be read in the measured value block using the ⇒ Vehicle Diagnostic Tester (Function "OBD" or "Guided Fault Finding" of the A/C system). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual).
- On vehicles with an Electrical A/C Compressor V470read out the A/C compressor speed sensor using the different control modules (for example, via the respective climate control module or the Thermal Management Control Module - J1024-) using the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

Vehicles with a mechanically driven A/C compressor

If A/C compressor is not driven with the engine running or regulating valve is not actuated:

- Determine and eliminate cause, for example by checking A/C system DTC memory.
- Observe the test requirements.
- Check the A/C Clutch N25- voltage supply. If it is OK, repair the A/C clutch.
- Check the A/C Compressor Regulator Valve N280- activation using the ⇒ Vehicle Diagnostic Tester ("OBD" function or "Guided Fault Finding" for the air conditioning). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual).



- If the low pressure switch was removed to connect the service station, bridge the electrical connections in the corresponding connector for the pressure measurement.
- A/C compressor is driven by the engine via A/C Clutch -N25- .
- The A/C Compressor Regulator Valve N280- is activated by the Front A/C Display Control Head E87-for Climatron relation part or in whole, is not ic Control Module - J255-em Use the auth Vehicle Diagnostic does not guarantee or accept any liability Tester ("OBD" function or "Guided Fault Finding" for the A/C system). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



Vehicles with an Electrical A/C Compressor - V470- (vehicles with a high-voltage system)

If the electrical A/C compressor is not activated while ready mode is active:

Check the A/C compressor activation via the respective control module. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and use the > Vehicle diagnostic tester in the "Guided Fault Finding" function.

All Vehicles

- Checking pressures on vehicles with a restrictor and reservoir (with internally regulated A/C compressor). Refer to Refer to ⇒ "8.2 Pressures, Checking, Vehicles with Restrictor and Reservoir, Internally Regulated A/C Compressor", page 214
- Checking pressures on vehicles with an expansion valve and receiver/dryer (with internally regulated A/C compressor). Refer to Refer to ⇒ "8.3 Pressures, Checking, Vehicles with Expansion Valve and Receiver/Dryer, Internally Regulated A/C Compressor", page 220.
- Checking pressures for vehicles with restrictor, reservoir and by copyright. Copying for private or commercial purposes, in part or in whole, is not unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability A/C Compressor Regulator Valve - N280- (externally regular respect to the correctness of information in this document. Copyright by AUDI AG. lated A/C compressor). Refer to \Rightarrow "8.4 Pressures, Checking, Vehicles with Restrictor, Reservoir and A/C Compressor Regulator Valve N280, Externally Regulated A/C Compressor", page 226.
- Checking pressures on vehicles with restrictor, receiver/dryer and A/C Compressor Regulator Valve - N280- (externally regulated compressor). Refer to ⇒ <u>*8.5 Pressures, Checking, Vehicles with Expansion Valve, Receiver/Dryer and A/C</u> Compressor Regulator Valve N280, Externally Regulated Compressor", page 235
- Check the pressures on vehicles with an electrically-driven A/C compressor (Audi A3 e-tron, Audi Q5 hybrid, Audi Q7 e-tron etc.). Refer to Refer to ⇒ *8.6 Pressures, Checking, Vehicles with Electrically Driven A/C Compressor (Vehicles with High-Voltage System)", page 250.
- 8.2 Pressures, Checking, Vehicles with Restrictor and Reservoir, Internally Regulated A/C Compressor

⇒ "8.2.1 Specified Values for the Refrigerant Circuit Pressures", page 215



Note

- Connect the A/C service station. Refer to ⇒ "7 A/C Service" Station, Connecting", page 203 .
- Observe the test requirements. Refer to ⇒ "8 Pressures, Checking", page 208
- With the ignition switched off, check the pressures in the refrigerant circuit (using the A/C service station). Refer to Refer to ⇒ "8.1 Refrigerant Circuit, Checking Pressure with Service Station", page 208.

The pressures with the ignition turned off meet the specifications.

Start the engine.

- Bring the engine speed up to 2000 RPM.
- Observe the pressure gauge of the A/C service station.



- The switching pressures for the refrigerant circuit switches are vehicle-specific.
- The connection with the valve for low-pressure switch or at the evaporator is only to be used on vehicles with no service connection on the low-pressure side and with an inaccessible connection on the A/C compressor or reservoir (measuring exactness). Only applies to specific vehicles. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

8.2.1 Specified Values for the Refrigerant Circuit Pressures

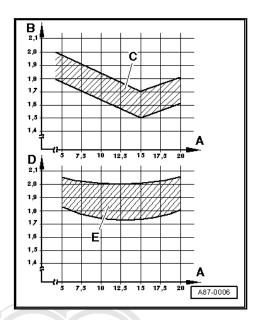
High-Pressure Side:

Increasing from initial pressure (when connecting the pressure gauges) to a maximum of 20 bar (290.08 psi).

Low-Pressure Side:

Decreasing from initial pressure (when connecting pressure gauges) to the value in the graph.

- A High Pressure (Measured at Service Connection) in Bar
- B Low pressure (measured at connection with valve at compressor or accumulator) in bar.
- C Permissible Tolerance Range
- D Low Pressure (Measured at Connection with Valve for Low-Pressure Switch or at Service Connection) in Bar
- E Permissible Tolerance Range



Possible deviation from specification	Possible cause of fault	Corrective action
High pressure remains constant or increases only slightly (above pressure with engine stopped),	Not enough refrigerant in refrigerant circuit.	and eliminate.
Low pressure quickly drops to value in graph or below		 Charge the refrigerant circuit.
The requested cooling output is not attained.	AU	

	Possible deviation from specifica- tion	Possible cause of fault	Corrective action
•	High pressure normal		
•	Low pressure in line with value in graph,		
•	The requested cooling output is not attained.		
•	High pressure normal		
•	Low pressure too low (see graph),		
•	The requested cooling output is not attained.		



If no error is detected with this complaint, clean the refrigerant "in the first detected with this complaint, clean the reingerant circuit (by flushing with refrigerant R134a, refer to Refer to ≥ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93; or clean using compressed air and nitrogen, refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).

Possible deviation from specification	Possible cause of fault	Corrective action
 High pressure does not increase or only increases slightly above pressure with engine stopped. Low pressure does not drop or drops only slightly. The requested cooling output is not attained. 	 The A/C compressor does not activate (the A/C clutch). The A/C compressor is not being driven. 	 Check and service the A/C compressor activation and motor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual).
	♦ Constriction or obstruction in refrigerant circuit (for example, inside the refrigerant line between the service connection "low pressure side" and the A/C compressor).	 Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89). Replace the hose or pipe if kinked or constricted.
	 A/C compressor faulty permitted unless authorised by AUDI A 	 Replace the A/C compressor vate or commercial purposes, in part of in whole, is not G. AUDI AG does not guarantee or accept any liability.

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F	Possible deviation from specification	Possible cause of fault		Corrective action
•	High pressure increases above specification Low pressure quickly drops to value in graph or below The requested cooling output is not attained.	Constriction or obstruction in refrigerant circuit.	_	Run hand over refrigerant circuit to check for differences in temperature. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
	Tiet diamed.		•	If difference in temperature is found at one component:
			_	Replace the hose or pipe if kinked or constricted.
	Protected by copyright. Copyi permitted unless authorised b with respect to the correctr	ng for private or commercial purposes, in part or in why AUDI AG. AUDI AG does not guarantee or accept a less of information in this document. Copyright by AU	uole, any I DI A	In the event of an obstruction, clean refrigerant circuit by iflushing with refrigerant R134a (Pefer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93), or blowing through with compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).
			•	If no malfunction can be found:
			_	Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).
•	High and low pressure normal at first after some time, High pressure increases above	Moisture in refrigerant circuit	_	Check the reservoir (with dry- er) and restrictor and replace if necessary. Then evacuate the refrigerant circuit for a mini-
	specification,			mum of three hours (see note).
•	Low pressure quickly drops to value in graph or below,		_	Clean the refrigerant circuit by flushing with refrigerant R134a
•	Required cooling output is no longer attained.			(refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).
•	High and low pressure normal at first.			
•	After lengthy operating period, the low pressure drops excessively (evaporator ices up).			





- If problem involving moisture in refrigerant circuit only occurs after a lengthy operating period or only infrequently (low pressure drops below specification and evaporator ices up), it is sufficient to replace the dryer (adjust quantity of refrigerant oil). Refrigerant circuit is then to be evacuated for at least three hours.
- It is not initially necessary to clean the refrigerant circuit by flushing using refrigerant R134a (refer to Refer to ≥ <u> 5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant</u> R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89 when this problem occurs since normally, there is only a small quantity of moisture in the system which can be removed by lengthy evacuation.

Pos	ssible deviation from specifica- tion	Possible cause of fault		Corrective action
• H	ligh pressure normal	A/C compressor faulty.	-	Clean the refriger-
	ow pressure too low (see raph),			ant circuit by flush- ing with refrigerant R134a (refer to Re-
	he required cooling perform- nce is obtained.			fer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).
			-	Replace the A/C compressor.



- For the fault "high pressure normal, low pressure too low", note the following: With this fault, it may be that the evaporator is icing up or the A/C Refrigerant Low Pressure Switch -F73- is turning off the A/C compressor, although the refrigerant quantity in the circuit is OK.
- For the Audi 100 Audi A6 through and including MY 1997) whole, is not and Audi 176 highes autimised by Audi 176 Audi 176 and Audi 176 a and Audi V8, this fault may result in the A/C compressor ht by AUDI AG. being shut off by the display control head (if the temperature at fresh air blower drops below -3 °C (26.6 °F)). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) or ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual).



Possible deviation from specification	Possible cause of fault	Corrective action
High pressure normal or too high,	Too much refrigerant in the circuit.	Extract refrigerant from the refrigerant circuit.
 Low pressure too high (see graph), 		If the quantity of
 A/C compressor noise (particularly after switch-on), 		refrigerant extracted roughly corresponds to specified capaci-
The requested cooling output is		ty:
not attained.		 Replacing the A/C compressor.
permitted unless authorised by AUI	private or commercial purposes, in part or in whole, is not DI AG. AUDI AG does not guarantee or accept any liability information in this document. Copyright by AUDI AG.	 If the quantity of re- frigerant extracted is substantially greater than specified ca- pacity:
	M/R	 Charge the refrigerant circuit.
		 Repeat the test.

P	ossible deviation from specifica- tion	Possible cause of fault		Corrective action
••••	High and low pressure normal, The requested cooling output is not attained. High and low pressure normal, A/C compressor noise (particularly after switch-on), The required cooling performance is obtained.	Too much refrigerant oil in the circuit.	_	Discharge the refrigerant circuit. Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).



- Overfilling with refrigerant oil can occur if, for example, the compressor has been replaced without adjusting the quantity of refrigerant oil.
- If there is too much refrigerant oil in the circuit, the A/C compressor must be discharged and the reservoir must be replaced. After cleaning the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a 93), or blowing through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89) fill the circuit with the correct quantity of refrigerant oil. Refer to Refer to 幸 '10.2 Approved Refrigerant Oils and Refrigerant Oil Capaci-<u>ties", page 360</u> .

8.3 Pressures, Checking, Vehicles with Expansion Valve and Receiver/Dryer, Internally Regulated A/C Compressor

⇒ "8.3.1 Specified Values for the Refrigerant Circuit Pressures", page 221



Note

- Connect the A/C service station. Refer to ⇒ "7 A/C Service Station, Connecting", page 203 .
- Observe the test requirements. Refer to ⇒ "8 Pressures," <u>Checking", page 208</u> .
- With the ignition switched off, check the pressures in the refrigerant circuit (using the A/C service station). Refer to Refer to ⇒ "8.1 Refrigerant Circuit, Checking Pressure with <u>ervice Station", page 208</u> .

The pressures with the ignition turned off meet the specifications.

- Start the engine.
- Bring the engine speed up to 2000 RPM.
- Observe the pressure gauge of the A/C service station.



Note

- Switching pressures and design of refrigerant circuit switches are vehicle-specific.
- Pressures must be measured at the service connections; the component location for these connections are vehiclespecific. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



Specified Values for the Refrigerant 8.3.1 **Circuit Pressures**

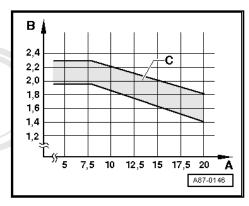
High-pressure side:

Increasing from initial pressure (when connecting the pressure gauges) to a maximum of 20 bar (290.08 psi).

Low-pressure side:

Decreasing from initial pressure (when connecting pressure gauges) to the value in the graph.

- A High Pressure in Bar
- B Low Pressure in Bar
- C Permissible Tolerance Range



	Possible deviation from specification	Possible cause of fault		Corrective action
•	High pressure remains by constant or increases of ur only slightly (above the response)	Not enough refrigerant in circuit orse expansion valve malfunctioning guara of to the correctness of information in this document. O	, in p ntee lopy	pa Extract refrigerant from the refrigerant concent any liability right by AUDI AG.
	pressure with engine stopped),		•	If the quantity of refrigerant extracted roughly corresponds to specified capacity:
•	Low pressure quickly drops to value in graph or below	ervven	_	Replace the expansion valve.
	The requested cooling		-	Charge the refrigerant circuit.
	output is not attained.		-	Repeat the test.
•	High pressure normal		•	If the quantity of refrigerant extracted is substantially less than specified ca-
•	Low pressure in line with value in graph,			pacity:
•	The requested cooling output is not attained.		_	Localize the leak with leak detector and eliminate.
	·		-	Charge the refrigerant circuit.
			_	Repeat the test.



Note

If no malfunction can be found and air conditioner operation is not OK when test is repeated, clean refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93), or blowing through with compressed air and nitrogen (refer to Refer to > "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).



Audi

	ossible devia- on from speci- fication	Po	ossible cause of fault	(Corrective action						
•	High pres- sure does not increase or only in- creases slightly above pres- sure with engine stopped.	• ·	The A/C compressor does not activate (the A/C clutch). The A/C compressor is not being driven.	tl a F V	Check and service the A/C compressor ctivation and motor. Refer to ⇒ Heating, Yentilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-spedific repair manual).						
•	Low pres- sure does not drop or drops only slightly.										
•	The requested cooling output is not attained.										
		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Constriction or obstruction in re- frigerant circuit (for example, in- side the refriger- ant line between the service con- nection "low pressure side" and the A/C compressor).	a ir for e iii E p tt to C	clean the refriger- int circuit by flush- ing with refrigerant R134a (refer to Re- ier to ⇒ "5.5 Refrig- ierant Circuit, Clean- ing (Flushing) with Refrigerant R134a", rage 93) or blow irrough using com- irrough using co	u by Audi A	AG. AUDI A	mercial purp G does not this docum	guarani	ee or a	CCE
			A/C compressor faulty.	_ p s _ F	Replace the hose or ipe if kinked or contricted. Replace the A/C ompressor.						



Possible deviation from specification	Possible cause of fault	Corrective action
High pressure increases above specification Low pressure quickly drops to value in graph or below The requested cooling output is not attained.	 Constriction or obstruction in refrigerant circuit. Expansion valve malfunctioning. 	 Run a hand over refrigerant circuit to check for differences in temperature. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit; System Overview - Refrigerant Circuit (vehicle-specific repair manual). If difference in temperature is found at one component:
		Replace the hose or pipe if kinked or constricted.
		In the event of an obstruction, clean the refrigerant circuit: flush with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93), or blow through with compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89), and replace the expansion valve if necessary.
		If no malfunction can be determined.
		 Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blowing through with compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89), and replace expansion valve if necessary.
		Repeat the test.



If the operation is not OK after cleaning refrigerant circuit by flushing with R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Copyright. Copyright. Copyright. Copyright or private or commercial purposes, in part or in whole, is not cuit, Cleaning (Flushing) with Refrigerant R134a", page 3.7 pess authorised by AUDI AG. AUDI AG does not guarantee or accept any liability or blowing the property of the correctness of information in this document. Copyright by AUDI AG. Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89), expansion valve must be replaced.

Possible deviation from specification	Possible cause of fault	Corrective action
 High and low pressure normal at first, After some time, high pressure increases above specification and low pressure drops to value in graph or below Required cooling output is no longer attained. 	 ◆ Expansion valve malfunctioning. ◆ Moisture in refrigerant circuit 	 Replace the receiver/dryer (with dryer) and evacuate the refrigerant circuit for a minimum of three hours (see notes). Examine the expansion valve for dirt or corrosion; replace if necessary. Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).
High and low pressure normal at first.		,
After lengthy operating period, the low pres- sure drops excessively (evaporator ices up).		

- It is not initially necessary to clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ≥ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93), or blowing through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89) when this problem occurs since normally, there is only a small quantity of moisture in the system which can be removed by lengthy evacuation.
- If problem involving moisture in refrigerant circuit only occurs after a lengthy operating period or only infrequently (low pressure drops below specification and evaporator ices up), it is sufficient to replace the dryer (adjust quantity of refrigerant oil). Refrigerant circuit is then to be evacuated for at least three hours.





Possible deviation from specification	Possible cause of fault	Corrective action
High pressure normal or too high,	 Too much refrigerant in the circuit. 	Extract refrigerant from the refrigerant circuit.
Low pressure too high (see graph),	 Expansion valve or A/C compressor faulty. 	roughly corresponds to specified
 The requested cooling output is not attained. 		capacity: Replace the expansion valve.
A/C compressor noise (particularly after switch-on).		Charge the refrigerant circuit.
		- Repeat the test.
		If the quantity of refrigerant ex- tracted is substantially greater than specified capacity:
		Charge the refrigerant circuit.
		- Repeat the test.

If air conditioner operation is not OK when test is repeated, install the old expansion valve, clean refrigerant circuit by flushing using refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93), or blowing through with compressed air and nitrogen (refer to Refer to > "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89). Then replace the A/C compressor and receiver/dryer.

Possible deviation from specification	Possible cause of fault	Corrective action
High pressure only increases slightly above pressure with engine stopped Low pressure drops only slightly The requested cooling output Proteis not attained bying for private or comm permitted unless authorised by AUDI AG. AUDI AG with respect to the correctness of information in the slightly above.	does not guarantee or accept any liability	 Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89). Replace the A/C compressor and receiver/dryer.

Possible deviation from specification	Possible cause of fault	Corrective action
High pressure normalLow pressure too low (see	Expansion valve or A/C compressor faulty.	Replace the expansion valve.
graph),		Charge the refrigerant circuit.Repeat the test.
The required cooling perform- ance is obtained.		. topout and took



- If air conditioner operation is not OK when test is repeated, install the old expansion valve, clean refrigerant circuit by flushing using refrigerant R134a (refer to Refer to = "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93), or blowing through with compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89). Then replace the A/C compressor and receiver/dryer.
- With this malfunction, evaporator may ice up although the quantity of refrigerant in circuit is OK.

P	ossible deviation from specifica. A with respect to the correctness of inf	G. AUDI Possible cause of faultany liabi ormation in this document. Copyright by AUDI AG.	lity	Corrective action
•	High and low pressure normal,	Too much refrigerant oil in the circuit.	-	Discharge the refrigerant circuit.
•	The requested cooling output is not attained.	Circuit.	_	Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).
•	High and low pressure normal,			
•	A/C compressor noise (particularly after switch-on),			
•	The required cooling performance is obtained.			



- Overfilling with refrigerant oil can occur if, for example, the compressor has been replaced without adjusting the quantity of refrigerant oil.
- If there is too much refrigerant oil in the circuit, the compressor must be drained and the receiver/dryer must be replaced. After cleaning the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93), or blowing through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89) fill the circuit with the correct quantity of refrigerant oil. Refer to Refer to ≥ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capaci-<u>ties", page 360</u> .
- 8.4 Pressures, Checking, Vehicles with Restrictor, Reservoir and A/C Com-



pressor Regulator Valve - N280-, Externally Regulated A/C Compressor

⇒ "8.4.1 Specified Values for the Refrigerant Circuit Pressures", page 227



Note

- Connect the A/C service station. Refer to ⇒ "7 A/C Service" Station, Connecting", page 203.
- Observe the test requirements. Refer to ⇒ "8 Pressures, <u>Checking", page 208</u> .
- With the ignition switched off, check the pressures in the refrigerant circuit (using the A/C service station). Refer to Refer to ⇒ "8.1 Refrigerant Circuit, Checking Pressure with Service Station", page 208.

The pressures with the ignition turned off meet the specifications.

- Start the engine.
- Bring the engine speed up to 2000 RPM.
- Observe the pressure gauge of the A/C service station.



Note

- The switching pressures for the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- and the Radiator Fan - V7- are vehicle specific.
- Pressures must be measured at the service connections; the component location for these connections are vehiclespecific. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

8.4.1 Specified Values for the Refrigerant Circuit Pressures

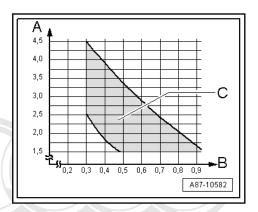
High-pressure side:

Increasing from initial pressure (when connecting pressure gauges) to 20 bar (290.08 psi).



Decreasing from initial pressure (when connecting pressure gauges) to the value in the graph.

- A Low Pressure (Measured at Service Connection) in Bar Absolute Pressure.
- B Control current for A/C Compressor Regulator Valve N280in amps.
- C Permissible Tolerance Range











- If high cooling output is needed (for example, the outside temperature is very high, the blower speed it set on high but the engine speeds are low), then the A/C compressor will not bring the pressure on the low pressure side to the value specified in the diagram -C- (for example, for a certain time after turning on the A/C). The A/C compressor is actuated with maximum specified control current, however delivery volume is no longer sufficient at this engine speed to reduce pressure on low-pressure side to value in graph. To check the A/C compressor control under these conditions, for example, the fresh air blower is activated only with approximately 40% of the maximum voltage and check the pressures at a lower fresh air blower speed. Use the ⇒ Vehicle Diagnostic Tester ("OBD" function or "Guided Fault Finding" for the A/C system) and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00 ; Repair Instructions; Cooling Output, Checking or ⇒ Heating, Ventilation and Air Conditioning; Reped Green 87 glist Refrigerant Circuit (vehicle-specific or in whole, is not repair manual) inte s authorised by AUDI AG. AUDI AG does not guarantee or accept any liability
- Under unfavorable conditions (very high ambient temperatures, high humidity), pressure on high-pressure side may increase up to maximum 29 bar (420.61 psi).
- The control current -B- is displayed in the measured value block of Front A/C Display Control Head - E87- or the Climatronic Control Module - J255- display control head.
- The refrigerant circuit pressure measured by the High Pressure Sensor - G65- or the A/C Pressure/Temperature Sensor - G395- is displayed in the measured value block for the Front A/C Display Control Head Front A/C Display Con-trol Head - E87- or the Climatronic Control Module - J255display control head. Use the ⇒ Vehicle Diagnostic Tester ("OBD" function or "Guided Fault Finding" for the A/C system) and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Low pressure settles as a function of control current for A/C Compressor Regulator Valve - N280- within compressor output range in tolerance range.
- Under unfavorable conditions (very high ambient temperatures, high humidity), compressor output may not always be sufficient to attain the specified value.
- If compressor capacity utilization is greater than 90 %, pressure on low-pressure side may be in excess of tolerance range "C" shown in graph (compressor output no longer sufficient).
- The specified operating current for the regulator valve must be greater than 0.3 A in order to ensure reliable valve activa-
- At absolute pressure, "0 bar (0 psi)" corresponds to absolute vacuum. Normal ambient pressure corresponds to 1 bar (14.5 psi) absolute pressure. 0 bar (0 psi) pressure corresponds to an absolute pressure of one bar on most pressure gauges (indicated by "-1 bar (-14.5 psi)" below "0").
- At the "maximum cooling output" setting, the control current is regulated to approximately 0.65 (vehicle-specific up to 0.85A, displayed in measured value block). Use the ⇒ Vehicle Diagnostic Tester ("OBD" or "Guided Fault Finding" for the A/C System) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking or ⇒ Heating, Ventilation and Air Conditioning;



Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual).

Possible deviation from specification	Possible cause of fault	Corrective action
 High pressure remains constant or increases only slightly (above pressure with engine stopped), Low pressure quickly drops to value in graph or below The requested cooling output is not attained. High pressure normal Low pressure too low (see graph), The requested cooling output is not attained. 	 Activation of A/C Compressor Regulator Valve - N280- mal- functioning. Not enough refrigerant in refrig- erant circuit. 	 Check the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- activation. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). Localize the leak with leak detector and eliminate. Charge the refrigerant circuit.



Note

If no error is detected with this complaint, clean the refrigerant circuit (by flushing with refrigerant R134a, refer to Refer to processes, in part or in whole, is not "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant burnses, in part or in whole, is not "5.5 Refrigerant Circuit, Cleaning with Refrigerant burnses, in part or in whole, is not "5.5 Refrigerant Circuit, Cleaning with Refrigerant burnses, in part or in whole, is not "5.5 Refrigerant Circuit, Cleaning with Refrigerant burnses, in part or in whole, is not "5.5 Refrigerant Circuit, Cleaning with Refrigerant burnses, in part or in whole, is not "5.5 Refrigerant Circuit, Cleaning with Refrigerant burnses, in part or in whole, is not "5.5 Refrigerant Circuit, Cleaning with Refrigerant burnses, in part or in whole, is not "5.5 Refrigerant Circuit, Cleaning with Refrigerant burnses, in part or in whole, is not "5.5 Refrigerant Circuit, Cleaning with Refrigerant burnses, in part or in whole, is not "5.5 Refrigerant Circuit, Cleaning with Refrigerant burnses, in part or in whole, is not "5.5 Refrigerant Circuit, Cleaning with Refrigerant burnses, in part or in whole, is not "5.5 Refrigerant Circuit, Cleaning with Refrigerant burnses, in part or in whole, is not "5.5 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).

Possible deviation from specification	Possible cause of fault	Corrective action
 High pressure does not increase or only increases slightly above pressure with engine stopped. Low pressure does not drop or drops only slightly. The requested cooling output is not attained. 	 The A/C compressor is not activated (A/C Compressor Regulator Valve - N280-) The A/C compressor is not being driven. 	 Check and service the A/C compressor activation and motor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual). Check the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- activation and function.
	◆ Constriction or obstruction in refrigerant circuit (for example, inside the refrigerant line between the service connection "low pressure side" and the A/C compressor).	 Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89). Replace the hose or pipe if kinked or constricted.



Possible deviation from specification	Possible cause of fault	Corrective action
	◆ A/C Compressor Regulator Valve - N280- faulty	 Check the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- function. If necessary, remove the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- and check for dirt. Refer to ⇒ "9.1.8 A/C Compressor Regulator Valve N280, Removing, Installing and Replacing", page 310
	 A/C compressor faulty. 	 Replace the A/C compressor.
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permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Possible deviation from specification	Possible cause of fault	Corrective action
 High pressure increases above specification Low pressure quickly drops to value in graph or below The requested cooling output is not attained. 	 Activation of A/C Compressor Regulator Valve - N280- mal- functioning. Constriction or obstruction in re- frigerant circuit. 	 Check the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- activation. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). Run hand over refrigerant circuit to check for differences in temperature. If difference in temperature is found at one component: Replace the hose or pipe if kinked or constricted. In the event of an obstruction, flush the refrigerant circuit with compressed air and nitrogen. If no error can be found: Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).

Possible deviation from specification	Possible cause of fault	Corrective action
High and low pressure normal at first, after some time high pressure increa- ses above specification.	♦ Activation of A/C Compressor Regulator Valve - N280- mal- functioning.	Check the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- activation. Refer to ⇒ Heating, Ventilon and Air
Low pressure quickly drops to value in graph or below,		Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
Required cooling output is no longer attained.		 Replace the reservoir (with dryer) and evacuate the refrigerant circuit for a minimum of three hours (see note).
High and low pressure normal at first.	◆ A/C Compressor Regulator Valve - N280- faulty	Check the A/C Compressor Regulator Valve A/C Compressor Regulator Valve N200 function If
After lengthy operating period, the low pressure drops excessively (evaporator ices up).		ulator Valve - N280- function. If necessary, remove the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- and check for dirt. Refer to ⇒ "9.1.8 A/C Compressor Regulator Valve N280, Removing, Installing and Replacing", page 310.
	◆ Moisture in refrigerant circuit	- Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).



- It is not initially necessary to clean the refrigerant circuit by flushing using refrigerant R134a (refer to Refer to "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refriger R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89) when this problem occurs since normally, there is only a small quantity of moisture in the system which can be removed by lengthy evacuation.
- If problem involving moisture in refrigerant circuit only occurs in whole, is not after a lengthy operating period or only infrequently (lowpressure drops below specification and evaporator ices up), by AUDI AG. it is sufficient to replace the dryer (adjust quantity of refrigerant oil). Refrigerant circuit is then to be evacuated for at least three hours.
- A malfunction on the Evaporator Vent Temperature Sensor - G263- can also cause icing-up of refrigerant circuit. With this complaint, also pay attention to the measured value for the Evaporator Vent Temperature Sensor - G263- . Use the ⇒ Vehicle Diagnostic Tester ("OBD" or "Guided Fault Finding" for the A/C System) and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking or ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

Possible deviation from specification	Possible cause of fault	Corrective action
 High pressure normal Low pressure too low (see graph), The required cooling performance is obtained. 	 Activation of A/C Compressor Regulator Valve - N280- mal- functioning. A/C Compressor Regulator Valve - N280- faulty 	 Check the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- activation. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). Check the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- function. If necessary, remove the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- and check for dirt. Refer to ⇒ "9.1.8 A/C Compressor Regulator Valve N280, Removing, Installing and Replacing", page 310.
	♦ A/C compressor faulty.	 Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).



For the malfunction "high pressure normal, low pressure too low" With this malfunction, evaporator may ice up, although quantity of refrigerant in circuit is OK. Check the measured values from the Evaporator Vent Temperature Sensor - G263- and the activation of the A/C Compressor Regulator Valve - N280- . If the measured value from the Evaporator Vent Temperature Sensor - G263- is incorrect, the evaporator may ice up or coolProtecting output is not reached. Use the ⇒ Vehicle Diagnostic Tester
permitt("OBD" or "Guided Fault Finding "for the A/C System) and refer
with to ⇒ Heating, Ventilation and Air Conditioning, Rep. Gr. 00; Repair Instructions; Cooling Output, Checking or ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

Replace the A/C compressor.

	Possible deviation from specification		Possible cause of fault		Corrective action
•	High pressure normal or too high,	•	Activation of A/C Compressor Regulator Valve - N280- malfunctioning.		Check the A/C Compressor Regulator Valve A/C
•	Low pressure too high (see graph),	•	Too much refrigerant in the circuit.		Compressor Regulator Valve - N280- activation. Refer to ⇒ Heating, Ventilation
•	A/C compressor noise (particularly after switchon),				and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
	The requested cooling output is not attained.		Protected by copyright. Copying for private or commercial purpermitted unless authorised by AUDI AG. AUDI AG does not with respect to the correctness of information in this document.	pose g u ar ient.	s, in part or in whole, is not a Extract refrigerant from the refrigeran Poircuit .
				•	If quantity of refrigerant extracted roughly corresponds to specified capacity:
				-	Replacing the A/C compressor.
				•	If the quantity of refriger- ant extracted is substantial- ly greater than specified ca- pacity:
				-	Charge the refrigerant circuit.
				_	Repeat the test.
•	High and low pressure normal,	•	Activation of A/C Compressor Regulator Valve - N280- malfunctioning.	-	Check the A/C Compressor Regulator Valve A/C Com-
•	The requested cooling output is not attained.	•	Too much refrigerant oil in the circuit.		pressor Regulator Valve - N280- activation.
				-	Discharge the refrigerant circuit.
•	High and low pressure normal.			-	Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to
•	A/C compressor noise (particularly after switchon).				⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Re- frigerant R134a", page 93)
•	The required cooling performance is obtained.				or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with
					Compressed Air and Nitrogen", page 89).



- Overfilling with refrigerant oil can occur if, for example, the compressor has been replaced without adjusting the quantity of refrigerant oil.
- If there is too much refrigerant oil in the circuit, the A/C compressor must be discharged and the reservoir must be replaced. After cleaning the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a 93), or blowing through with compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89), fill the circuit with the correct quantity of refrigerant oil. Refer to Refer to ⇒ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacis not *ties* mit page 360 horised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.
- 8.5 Pressures, Checking, Vehicles with Expansion Valve, Receiver/Dryer and A/C Compressor Regulator Valve - N280-, Externally Regulated Compressor

⇒ "8.5.1 Specified Values for the Refrigerant Circuit Pressures", page 236



Note

- Connect the A/C service station. Refer to ⇒ "7 A/C Service" Station, Connecting", page 203.
- Observe the test requirements. Refer to ⇒ "8 Pressures, <u>Checking", page 208</u> .
- If a malfunction occurs at only one evaporator in vehicles with two evaporators, also check pressures in the refrigerant circuit, are these OK? Check the line connection between the evaporator in question and the exit of line connection at distribution point of refrigerant lines (for constriction). If no malfunction can be detected, discharge the refrigerant circuit and charge it with the specified refrigerant quantity. Then check the pressures and the A/C system cooling output again; if the complaint still exists, replace the expansion valve that is prematurely switched by the questioned evaporator. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- With the ignition switched off, check the pressures in the refrigerant circuit (using the A/C service station). Refer to Refer to ⇒ "8.1 Refrigerant Circuit, Checking Pressure with Service Station", page 208

The pressures with the ignition turned off meet the specifications.

- Start the engine.
- Bring the engine speed up to 2000 RPM.
- Observe the pressure gauge of the A/C service station.



- The switching pressures for activation of A/C Compressor Regulator Valve - N280- and Radiator Fan - V7- are vehiclespecific.
- Pressures must be measured at the service connections; the component location for these connections are vehiclespecific. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

Specified Values infor the Refrigerants, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability Circuit Pressures ess of information in this document. Copyright by AUDI AG. 8.5.1

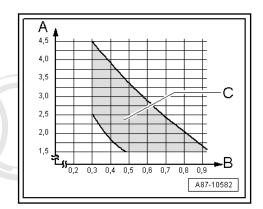
High-Pressure Side:

Increasing from initial pressure (when connecting the pressure gauges) to a maximum of 20 bar (290.08 psi).

Low Pressure:

Decreasing from initial pressure (when connecting pressure gauges) to the value in the graph.

- A Low Pressure (Measured at Service Connection) in Bar Absolute Pressure.
- B Control current for A/C Compressor Regulator Valve N280in amps.
- C Permissible tolerance range (applicable to compressor capacity utilization of 10 to 90 %)







- If high cooling output is needed (for example, the outside temperature is very high, the blower speed it set on high but the engine speeds are low), then the A/C compressor will not bring the pressure on the low pressure side to the value specified in the diagram -C- (for example, for a certain time after turning on the A/C). The A/C compressor is actuated with maximum specified control current, however delivery volume is no longer sufficient at this engine speed to reduce pressure on low-pressure side to value in graph. To check the A/C compressor control under these conditions, for example, the fresh air blower is activated only with approximately 40% of the maximum voltage and check the pressures at a lower fresh air blower speed. Use the ⇒ Vehicle Diagnostic Tester ("OBD" function or "Guided Fault Finding" for the A/C system) and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking or ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Under unfavorable conditions (very high ambient temperatures, high humidity), pressure on high-pressure side may increase to maximum 29 bar (420.61 psi).
- Copying for private or commercial purposes, in part or in whole, is not The control current -B- is displayed in the measured value DI AG does not quarantee or accept any liability *block of Front A/C Display Control∘Head ™E87∞or the Olima*≥in this document. Copyright by AUDI AG. tronic Control Module - J255- .
- The high pressure measured by the High Pressure Sensor - G65- (or the A/C Pressure/Temperature Sensor - G395or the Refrigerant Circuit Pressure Sensor - G805-) is displayed as a measured value (by the Front A/C Display Control Head Front A/C Display Control Head - E87- , the A/C Control Module - J301- or the Climatronic Control Module -J255- display control head).
- Low pressure settles depending on the control current for A/C Compressor Regulator Valve - N280- and control characteristic of expansion valve within compressor output range in tolerance range.
- Under unfavorable conditions (very high ambient temperatures, high humidity), compressor output may not always be sufficient to attain the specified value.
- If compressor capacity utilization is greater than 90 %, pressure on low-pressure side may be in excess of tolerance range "C" shown in graph (compressor output no longer sufficient).
- The specified operating current for the A/C Compressor Regulator Valve - N280- must be greater than 0.3 A in order to ensure reliable regulator valve actuation.
- In "maximum cooling output" setting, control current for A/C Compressor Regulator Valve - N280- is regulated to approximately 0.65 A (up to 0.85 A). This measured value is vehicle-specific and displayed in the measured value block.
- At absolute pressure, 0 bar (0 psi) corresponds to absolute vacuum. Normal ambient pressure corresponds to 1 bar (14.5 psi) absolute pressure. On the scales of most pressure gauges, 0 bar (0 psi) corresponds to an absolute pressure of one bar (can be seen from -1 bar (-14.5 psi) mark below 0). Use the ⇒ Vehicle Diagnostic Tester ("OBD" or "Guided Fault Finding" for the A/C System) and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Checking Cooling Output or ⇒ Heating, Ventila-



tion and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

P	ossible deviation from speci- fication		Possible cause of fault		Corrective action
•	High pressure remains constant or increases only slightly (above pressure with engine stopped), Low pressure quickly drops to value in graph or below. The requested cooling output is not attained.	*	Activation of A/C Compressor Regulator Valve - N280- malfunctioning. Not enough refrigerant in refrigerant circuit. Expansion valve malfunctioning.	-	Check the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- activation. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). Extract refrigerant from the refrigerant circuit. If quantity of refrigerant ex-
					tracted is substantially less than specified capacity:
	High pressure normal Low pressure in line with value in graph,			_	Localize the leak with leak detector and eliminate. Charge the refrigerant cir-
•	The requested cooling output is not attained.			_	cuit. Repeat the test.
•	High pressure normal Low pressure too low (see graph)			•	If quantity of refrigerant extracted roughly corresponds to specified capacity:
•	The requested cooling output is not attained.	X		_	Replace the expansion valve.
		X		_	Charge the refrigerant circuit. Repeat the test.







- If no error is detected with this complaint, clean the refrigerant circuit (by flushing with refrigerant R134a, refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93; or clean using compressed air and nitrogen, refer to Refer to ⇒ "5.4 Refrigerant Circuit, Clean-<u>ing with Compressed Air and Nitrogen", page 89</u>).
- Check the measured values from the Evaporator Vent Temperature Sensor - G263- and the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- . If the measured value of the Evaporator Vent Temperature Sensor G263- is incorrect, the evaporator may ice up or cooling output is not attained.
- If air conditioner operation is not OK when test is repeated after replacing expansion valve, install old expansion valve, clean refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93), or blowing through with compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89). Then replace the A/C compressor and receiver/dryer.
- With this malfunction, evaporator may ice up although the quantity of refrigerant in circuit is OK.
- If the expansion valve is faulty (constantly closed or does not open far enough), the A/C Compressor Regulatories alvesticated by AUDI AG. AUDI AG does not guarantee or accept any liability Compressor Regulator Valve - N280- is actuated to maximent to the soft information in this document. Copyright by AUDI AG. mum output and the low pressure drops to value in graph or below (the A/C compressor draws off refrigerant from lowpressure side). Since the refrigerant cannot flow via the expansion valve, cooling output is not attained. High pressure may also not increase or only increase slightly due to the absence of energy. Use the ⇒ Vehicle Diagnostic Tester ("OBD" or "Guided Fault Finding" for the A/C System) and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking or ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

Possible devia- tion from specifi- cation	Possible cause of fault	Corrective action
High pressure does not increase or only increases slightly above pressure with engine stopped. Low pressure does not drop or drops only slightly. The requested cooling output is not attained.	 ◆ The A/C compressor is not activated (A/C Compressor Regulator Valve - N280-) ◆ The A/C compressor is not being driven. 	 Check and service the A/C compressor activation and motor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual).



Possible devia- tion from specifi- cation	Possible cause of fault	Corrective action
	A/C Compressor Regulator Valve - N280- faulty. Protected by copyright permitted unless auth with respect to the	prised N2801 and Checkes not guarantee or accept any liability correctness of information in this document. Copyright by AUDI AG. "9.1.8 A/C Compressor Regulator Valve N280, Removing, Installing and Replacing", page 310.
	◆ Constriction or obstruction in refrigerant circuit (for example, inside the refrigerant line between the service connection "low pressure side" and the A/C compressor).	- Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).
	◆ A/C compressor faulty.	 Replace the hose or pipe if kinked or constricted. Replace the A/C compressor.



- Make sure that the A/C compressor (the A/C compressor shaft) is actually being driven by the belt pulley/drive unit for this complaint. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual).
- From MY 2012, certain engines and A/C compressor versions are being introduced that, in addition to the A/C Compressor Regulator Valve A/C Compressor Regulator Valve -N280- , an A/C Clutch - N25- is being attached to the belt pulley. Make sure that the A/C Clutch A/C Clutch - N25- is actually being actuated and the A/C compressor (A/C compressor shaft) is being driven by the belt pulley. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual) and to the ⇒ Electronic Parts Catalog (ETKA) .







	Possible deviation from specification	Possible cause of fault		Corrective action
•	High pressure increases above specification Low pressure quickly drops to value in graph, Required cooling output is not attained.	 Activation of A/C Compressor Regulator Valve - N280- mal- functioning. Constriction or obstruction in re- frigerant circuit. Expansion valve malfunctioning. 	_	Check the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- activation. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
			_	Run hand over refrigerant circuit to check for differences in temperature.
			•	If difference in temperature is found at one component:
			_	Replace the hose or pipe if kinked or constricted.
			_	In the event of an obstruction, clean refrigerant circuit by flushing with refrigerant R134a (refer to Refer to > "5.5 Refrigerant Circuit, Cleaning (Flushing) with Pofrigerant R134a"
				(Flushing) with Refrigerant R134a", page 93), or blowing through with compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).
			_	Charge the refrigerant circuit.
			_	Repeat the test.
			•	If no error can be found:
		AUO	_	Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with
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			_	Charge the refrigerant circuit.
			_	Repeat the test if the function is not OK:
			_	Replace expansion valve and receiver/dryer



- If the function of the A/C system is not OK when the test is repeated, replace the expansion valve and receiver/dryer.
- With this malfunction, evaporator may ice up although the quantity of refrigerant in circuit is OK.
- If the expansion valve is faulty (constantly closed or does not open far enough), the A/C Compressor Regulator Valve - N280- is actuated to maximum output and low pressure drops to value in graph or below (the A/C compressor draws off refrigerant from low-pressure side). Since the refrigerant cannot flow via the expansion valve, the cooling output is not attained. High pressure may also not increase or only increase slightly due to the absence of energy. Use the ⇒ Vehicle Diagnostic Tester ("OBD" or "Guided Fault Finding" for the A/C System) and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking or ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- If there is too much refrigerant oil in the circuit, the compressor must be drained and the receiver/dryer must be replaced. After cleaning the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93), or blowing through with compressed air and nitrogen hole is not (refer to Refer to 3.2. Refrigerant Circuit Cleaning with AUDI AG. Compressed Air and Nitrogen", page 89), fill the circuit with the correct quantity of refrigerant oil. Refer to Refer to ⇒ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities", page 360

F	ossible deviation from speci- fication		Possible cause of fault		Corrective action
•	High and low pressure normal at first after some time,	•	Activation of A/C Compressor Regulator Valve - N280- malfunctioning.	_	Check the A/C Compressor Regulator Valve A/C Com-
•	High pressure increases above specification,	•	Moisture in refrigerant circuit		pressor Regulator Valve - N280- activation. Refer to ⇒ Heating, Ventilation
•	Low pressure quickly drops to value in graph or below,				and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair man- ual).
•	Required cooling output is no longer attained.			_	Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).

Possible deviation from specification	Possible cause of fault	Corrective action
High and low pressure nor- mal at first,		Replace the receiver/dryer with dryer.
 After lengthy driving time, low pressure drops exces- sively (evaporator ices up). 		Evacuate the refrigerant circuit for at least three hours.
		Charge the refrigerant circuit.
		 Repeat the test.
	◆ A/C Compressor Regulator Valve - N280- faulty	 Check the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- function. If necessary, remove the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- and check for dirt. Refer to Refer to ⇒ "9.1.8 A/C Compressor Regulator Valve N280, Removing, Installing and Replacing", page 310



- It is not initially necessary to clean the refrigerant circuit by flushing using refrigerant R134a (refer to Refer to ≥ 5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89 when this problem occurs since normally, there is only a small quantity of moisture in the system which can be removed by lengthy evacuation.
- If a problem involving moisture in refrigerant circuit only occurs after a lengthy operating period or only infrequently (low pressure drops below specification and evaporator ices up), it is sufficient to replace the dryer installed in receiver/dryer (adjust quantity of refrigerant oil). Refrigerant circuit is then to be evacuated for at least three hours.
- With this malfunction, evaporator may ice up although the quantity of refrigerant in circuit is OK.
- A malfunction on the Evaporator Vent Temperature Sensor - G263- can also cause icing-up of refrigerant circuit. With this complaint, also pay attention to the measured value for the Evaporator Vent Temperature Sensor - G263- . Use the ⇒ Vehicle Diagnostic Tester ("OBD" or "Guided Fault Find-ing" for the A/C System) and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking or ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).





P	ossible deviation from speci- fication	Possible cause of fault	Corrective action
•	High pressure normal Low pressure too low (see graph), The required cooling performance is obtained.	◆ Activation of A/C Compressor Regulator Valve - N280- malfunctioning.	 Check the A/C Compressor Regulator Valve A/C Compressor Regulator Valve N280- activation. Referto Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
			- Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93); or blowing through with compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89) (not always necessary, see notes).
		◆ A/C Compressor Regulator Valve - N280- faulty	 Check the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- function. If necessary, remove the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- and check for dirt. Refer to Refer to ⇒ "9.1.8 A/C Compressor Regulator Valve N280, Removing, Installing and Replacing", page 310
		 Expansion valve or A/C compressor faulty. 	 Replace expansion valve and receiver/dryer
		◆ A/C compressor faulty.	 Charge the refrigerant circuit.
			 Repeat the test if the function is not OK:
			 Replace the A/C compressor.
		X X	 Charge the refrigerant circuit.
			 Repeat the test.







- For the malfunction "high pressure normal, low pressure too low" With this malfunction, evaporator may ice up, although quantity of refrigerant in circuit is OK.
- If the fault is with the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- (regulator valve is not actuated but A/C compressor operates nevertheless), it is not necessary to clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blowing through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89). In this case, it is sufficient to replace the A/C compressor (observe quantity of nt. Copying for private or commercial purposes, in part or in whole, is not refrigerant oil in A/C compressor).

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- If the expansion valve is faulty (constantly closed or does not open far enough), the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- is actuated to maximum output and low pressure drops to value in graph or below (A/C compressor draws off refrigerant from low-pressure side). As however refrigerant cannot flow via the expansion valve, the cooling output is not attained and high pressure may also not increase or only increase slightly due to the absence of energy conversion.
- Check the measured values of the Evaporator Vent Temperature Sensor - G263- and the activation of the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- . If the measured value from the Evaporator Vent Temperature Sensor - G263- is incorrect, the evaporator may ice up or cooling output is not reached. Use the ⇒ Vehicle Diagnostic Tester ("OBD" or "Guided Fault Finding "for the A/C System) and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00 ; Repair Instructions; Cooling Output, Checking or ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).





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Possible deviation from specification	Possible cause of fault	Corrective action
 High pressure normal or too high, Low pressure too high (see graph), A/C compressor noise (particularly after switchon), The required cooling performance is obtained. 	 Activation of A/C Compressor Regulator Valve - N280- malfunctioning. Too much refrigerant in the circuit. Expansion valve malfunctioning. A/C compressor faulty. 	 Check the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- activation. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). Extract refrigerant from the refrigerant circuit. If quantity of refrigerant extracted roughly corresponds to specified capacity: Replace expansion valve and receiver/dryer Charge the refrigerant circuit. Repeat the test if the function is not OK: Replacing the A/C compressor. If quantity of refrigerant extracted is substantially greater than specified ca-
		pacity:Charge the refrigerant circuit.Repeat the test.



- This fault may also be caused by too much refrigerant oil in erial purposes, in part or in whole, is not the circuit. Overfilling with refrigerant oil can occur if, for ex-does not guarantee or accept any liability ample, the compressor has been replaced without adjusting document. Copyright by AUDI AG the quantity of refrigerant oil.
- If the expansion valve is faulty (constantly closed or does not open far enough), the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- is actuated to maximum output and the low pressure drops to value in graph or below (the A/C compressor draws off refrigerant from low-pressure side). Since the refrigerant cannot flow via the expansion valve, the cooling output is not attained. High pressure may also not increase or only increase slightly due to the absence of energy. Use the ⇒ Vehicle Diagnostic Tester ("OBD" or "Guided Fault Finding" for the A/C System) and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking or ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



Po	ossible deviation from speci- fication		Possible cause of fault		Corrective action
•	High and low pressure normal,	•	Activation of A/C Compressor Regulator Valve - N280- malfunctioning.	_	Check the A/C Compressor Regulator Valve A/C Com-
•	The required cooling performance is obtained.	* * ·	Too much refrigerant in the circuit. Expansion valve malfunctioning.		pressor Regulator Valve - N280- activation. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
	permitted unless auth	noris	opying for private or commercial purposes, in part or in whole ed by AUDI AG. AUDI AG does not guarantee or accept any ectness of information in this document. Copyright by AUDI	liabi	Discharge the refrigerant circuit. Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to \$\inquare\$ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to \$\inquare\$ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).
•	High and low pressure normal,			_	Fill in correct quantity of re- frigerant oil into circuit (see
•	A/C compressor noise (particularly after switchon),			_	note). Charge the refrigerant circuit.
•	The required cooling performance is obtained.			_	Repeat the test if the function is not OK:
				_	Replace the expansion valve.
				_	Charge the refrigerant circuit.
				_	Repeat the test.



- Overfilling with refrigerant oil can occur if, for example, the compressor has been replaced without adjusting the quantity of refrigerant oil.
- If the expansion valve is malfunctioning (permanently open), evaporator temperature is no longer regulated such that only refrigerant in gaseous state exits from the evaporator. Under certain usage conditions, liquid droplets may then be drawn in by the compressor and cause noise (liquid cannot be compressed).
- If there is too much refrigerant oil in the circuit, the compressor must be drained and the receiver/dryer must be replaced. After cleaning the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93), or blowing through with compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, © leaning with at or commercial purposes, in part or in whole, is not Compressed Air and Nitrogen", page 89)s fill the circuit with UDI AG does not guarantee or accept any liability the correct quantity of refrigerant oil. Refer to Refer to information in this document. Copyright by AUDI AG. <u>'10.2 Approved Refrigerant Oils and Refrigerant Oil Capaci-</u> <u>ties", page 360</u> .
- Pressures, Checking, Vehicles with 8.6 Electrically Driven A/C Compressor (Vehicles with High-Voltage System)
- "8.6.1 Specified Values for Refrigerant Circuit Pressures, Vehicles without Heat Pump", page 253
- <u>*8.6.2 Specified Values for Refrigerant Circuit Pressures, Ve-</u> hicles with Heat Pump", page 279
- On vehicles with a high-voltage system, switch off (deactivate) the "auxiliary climate control" function. Refer to the ⇒ Owner's Manual and ⇒ Infotainment/MMI Operating Man-
- Switch off the ignition.



If a malfunction occurs at only one evaporator in vehicles with two evaporators (one evaporator in the A/C unit and the other in the battery cooling module or in the high-voltage battery heat exchanger), also check pressures in the refrigerant circuit, are these OK? Check the line connection between the evaporator in question and the exit of line connection at distribution point of refrigerant lines (for constriction or blockage, for example in the refrigerant line restrictor to the high-voltage battery heat exchanger). If no malfunction can be detected, discharge the refrigerant circuit and charge it with the specified refrigerant quantity. Then check the pressures and A/C system cooling output again; if the malfunction occurs again, check / replace the following components: if the complaint is only occurs at the evaporator in the A/C unit, the shut-off valve is prematurely switched by the evaporator (for example Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- or the Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541-). This component is open when it is not activated and allows the refrigerant to flow through. Replace the expansion valve on the evaporator in the A/C unit, if no fault can be found on the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- / Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541- . If a malfunction occurs only on the evaporator for the cooling the high-voltage components (for example in the battery cooling module), check the activation of the Hybrid Battery Refrigerant Shut-Off Valve 2 Hybrid Battery Refrigerant Shut-Off Valve 2 - N517- on the evaporator expansion valve in the battery cooling module (it is closed when it is not activated and does not allow the refrigerant to flow through). If the complaint only occurs at the high-voltage battery heat exchanger, check the High-Voltage Battery Heater Core Refrigerant Shut-Off Valve High-Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542- (it is open when it is not activated and allows the refrigerant to flow through) and the restrictor installed in the refrigerant line. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

With the ignition switched off, check the pressures in the refrigerant circuit (using the A/C service station). Refer to Refer to <u>⇒ "8.1 Refrigerant Circuit, Checking Pressure with</u> Service Station", page 208.

The pressures with the ignition turned off meet the specifications.

Charge the vehicle batteries, for example, using the Battery Charger LVAS 5904-cin the battery support mode to mini in whole, is not mize the number of automatic starts during the test and cept any liability measuring procedures while the ready mode is active ReAUDI AG. fer to ⇒ Electrical Equipment General Information; Rep. Gr. 27; Battery; Battery, Charging and ⇒ Electrical Equipment; Rep. Gr. 93; General Warnings for Working on High-Voltage System .

- Also move the selector lever into position "P" and activate the parking brake for testing and measuring procedures that require the ignition to be on, but do not require the ready mode to be active.
- The engine must not be running when checking the pressures in the refrigerant circuit on vehicles with a high-voltage
- The drive ready mode is displayed in the Instrument Cluster Control Module - J285- via the "power meter". Refer to ⇒ Owner's Manual .
- Activate the ready mode (and observe the display in the Instrument Cluster Control Module - J285-). Refer to the *⇒ Owner's Manual .*
- Activate the drive ready mode. Refer to the ⇒ Owner's Manual.
- Switch the A/C system on.
- Observe the pressure gauge of the A/C service station.



- The activation of the electrically driven A/C compressor occurs from the vehicle electrical system. The engine speed does not have any effect on the A/C cooling output.
- The A/C compressor is not actuated at the maximum specified speed (of approximately 8500/min) on a stationary or slow moving vehicle (up to a speed of approximately 45km/h (28 mph)) (the A/C compressor speed is limited to approximately 5000/min).
- The activation of the electrically driven A/C compressor can be monitored by the Guided Fault Finding using the ⇒ Vehicle Diagnostic Fester in the "Guided Fault Finding" function part or in whole, is not for A/C system and the Battery Regulation of the system and the Battery Regulation in this document. Copyright by AUDI AG.
- Pressures must be measured at the service connections; the component location for these connections are vehiclespecific. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



8.6.1 Specified Values for Refrigerant Circuit Pressures, Vehicles without Heat **Pump**



Note

On vehicles with a high-voltage system but without a heat pump (for example on Audi A3 e-tron, Audi Q5 hybrid, Audi A6 hybrid and Audi A8 hybrid) no check valves are installed in the refrigerant circuit. On these vehicles valves are installed in the refrigerant circuit which regulate the flow of the refrigerant to the evaporator (in the heater and A/C unit) or to the heat exchanger for the cooling of the component's of the high-voltage system. These valves only have two operating conditions (open or closed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" function for the A/C system and battery control .

High-Pressure Side:

Increasing from initial pressure (when connecting the pressure gauges) to a maximum of 20 bar (290.08 psi).

Low-Pressure Side:

Decreasing from initial pressure (when connecting the pressure gauges) to a value between 1.5 and 2.3 bar (21.76 and 33.36 psi) absolute pressure (depending on the required cooling output).

A/C Compressor Speed:

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Depending on the required cooling output between 800 and 8600 /min (currently a maximum of 5000/min for parked vehicles).





- The temperature of the air after the evaporator, the current A/C compressor speed, and the pressure of the refrigerant on the high pressure side are displayed depending on the vehicle as the measured value from various control modules (for example the display control head, the Climatronic Control Module - J255-, the Front A/C Display Control Head - E87-, the Thermal Management Control Module - J1024-etc.). Use the ⇒ Vehicle Diagnostic Tester in the "Guided" Fault Finding" function of the A/C system and refer to ⇒ Wiring diagrams, Troubleshooting & Component locations.
- If a high cooling output is required (for example, a high outside temperature and the blower speed set on high), then the A/C compressor will not bring the pressure on the low pressure side to the required value (for example, pfor as, in part or in whole, is not certain time after turning on the A/C) UThe A/C (compressor intee or accept any liability is not actuated at the maximum specified speed (of approx opyright by AUDI AG. imately 8500/min) on a stationary or slow moving vehicle (up to a speed of approximately 45km/h (28 mph)) (the A/C compressor speed is limited to approximately 5000/min). After a vehicle reaches a speed of more than approximately 45 km (28 miles) /h, the limit for the maximum permissible A/C compressor speed is lifted. At a A/C compressor speed of 5000 RPM, a high outside temperature and a high fresh air blower speed (inefficient environmental controls), the A/C compressor output (the delivery volume) is no longer sufficient to reduce the pressure on the low pressure side to the target value. To check the A/C compressor control under these conditions, for example, the fresh air blower is controlled only activates with approximately 40% of the maximum voltage, check the pressures at a lower fresh air blower speed. Ŭse the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" function for A/C System and the Battery Regulation . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00 ; Repair Instructions; Cooling Output, Checking (vehicle-specific repair manual).
- Under unfavorable conditions (very high ambient temperatures, high humidity), pressure on high-pressure side may increase to maximum 29 bar (420.61 psi).
- The specified rpm of the A/C compressor is displayed as the measured value of the different control modules depending on the vehicle (for example from the display control head, the Climatronic Control Module - J255-). Refer to the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" function of the A/C system and ⇒ Wiring diagrams, Troubleshooting & Component locations.)
- The measured high pressure of the respective sensor (for example from the A/C Pressure/Temperature Sensor - G395- or by the Refrigerant Circuit Pressure Sensor G805-) is displayed as a measured value from the respective control module (for example from the Climatronic Control Module - J255- display control head). Use the ⇒ Vehicle Diagnostic Tester "Guided Fault Finding" function for the A/C system and ⇒ Heating, Ventilation and Air Conditioning, Rep. Gr. 00; Repair Instructions; Cooling Output, Checking (vehicle-specific repair manual).
- Depending on the A/C compressor speed and the control characteristic of the expansion valve, the low pressure settles within the A/C compressor output range in the tolerance range (1.5 to 2.3 bar (21.76 to 33.36 psi) positive pressure).
- The specified speed of the A/C compressor must for this test be greater than 1500 RPM.

- In setting "maximum cooling output" the target speed is regulated to approximately 4000 up to 5000 /min. This value is vehicle-specific and is displayed as a measured value of the respective control module (for example the Climatronic Control Module - J255-) display and control head. Use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for A/C System and Battery Regulator .
- At absolute pressure, 0 bar (0 psi) corresponds to absolute vacuum. Normal ambient pressure corresponds to 1 bar (14.5 psi) absolute pressure. On the scales of most pressure gauges, 0 bar (0 psi) corresponds to an absolute pressure of 1 bar (14.5 psi) (can be seen from -1 bar (-14.5 psi) mark below 0). Use the ⇒ Vehicle Diagnostic Tester in the function "Guided Fault Finding" for the A/C System) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking (vehicle-specific repair manual).
- If, on a vehicle with two evaporators (for example on a Audi A8 hybrid, one in the A/C unit and one for cooling the high-voltage components, for example, in the battery cooling module or the high-voltage battery heat exchanger as in the Audi A3 e-tron), the measured temperature on one evaporator corresponds to the specified value or the specified value falls short, but does not reach the required specified value on the other evaporator, the following adjustment is performed: the responsible control module (the Battery Regulation Control Module Battery Regulation Control Module - J840- or the Climatronic Control Module Climatronic Control Module - J255-) activates the Electrical A/C Compressor - V470- with increased speed via various other control modules (for example, the Electric Drive Power and Control Electronics - JX1- and the A/C Compressor Control Module - J842-). Thereby increasing the A/C cooling output and decreasing the pressure on the low pressure side as well as the evaporator temperature. If the specified value for the temperature falls short at one evaporator, the relevant control module (for example the Battery Regulation Control Module Battery Regulation Control Module - J840or the Climatronic Control Module Climatronic Control Module - J255-) activates the installed shut-off valves (Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516-, Heater and A/C Unit Re-frigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541- , Hybrid Battery Refrigerant Shut-Off Valve 2 Hybrid Battery Refrigerant Shut-Off Valve 2 - N517or High-Voltage Battery Heater Core Refrigerant Shut-Off Valve High-Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542-) so that the evaporator which is too cold is no longer supplied with refrigerant. Use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding "Function for the A/C System . Refer to ⇒ Wiring diagrams, Troubleshooting & Component locations and ⇒ Heating Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions a Cooling and Auro Advisor of the Conditioning in the Conditioning is a component location of the Conditioning in the Conditioning is a component location of the Conditioning in the Conditioning is a component location of the Conditioning in the Conditioning is a conditioning in the Conditioning in the Conditioning is a conditioning in the Conditioning in the Conditioning is a conditioning in the Conditioning in the Conditioning is a conditioning in the Conditioning in the Conditioning is a conditioning in the Conditioning in the Conditioning is a conditioning in the Conditioning in the Conditioning is a conditioning in the Conditioning in the Conditioning is a conditioning in the Conditioning in the Conditioning is a conditioning in the Conditioning in the Conditioning in the Conditioning in the Conditioning is a conditioning in the Conditioning in
- Since the evaporator for cooling the high-voltage components output (in the battery cooling module and in the highvoltage battery heat exchanger) is essential for the evaporator output in the A/C unit, the required target temperature may still be reached in the evaporator for cooling the highvoltage battery with too little refrigerant in the refrigerant circuit, but the target temperature in the A/C unit evaporator will no longer be attainable (even though the A/C compressor is activated with increased A/C unit speed).

Output, Checking (vehicle-specific repair manual) rectness of information in this document. Copyright by AUDI AG.



Possible deviation from specification	Possible cause of fault		Corrective action
 High pressure remains constant or increases only slightly (above pressure with engine stopped), Low pressure quickly drops to specified value or lower. The required cooling output is not attained in the A/C unit evaporator and in the evaporator for cooling the high-voltage components. 	 Activation of the A/C compressor is malfunctioning. Use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for the A/C System, the A/C Compressor and the Battery Regulator . Not enough refrigerant in refrigerant circuit. The evaporator expansion valve in the A/C unit is faulty. Shut-off valve in front of the evaporator in the A/C unit (for example Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- or Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541-, depending on the vehicle) is faulty (closed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). 	- - -	Check the A/C compressor activation and function. Extract refrigerant from the refrigerant circuit. If quantity of refrigerant extracted is substantially less than specified capacity: Localize the leak with leak detector and eliminate. Charge the refrigerant circuit. Repeat the test.
High pressure normal Low pressure corresponds			If quantity of refrigerant extracted roughly corresponds to specified capacity:
permitted unless authorised by AU	r private or commercial purposes, in part or in whole, is not DI AG. AUDI AG does not guarantee or accept any liability of information in this document. Copyright by AUDI AG.		Check the shut-off valve function in front of the evaporator in the A/C unit (for example Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- or Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541-, depending on the vehicle). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
			Replace the expansion valve.
			Charge the refrigerant circuit.
		-	Repeat the test.



Read the supporting information. Refer to <u>⇒ page 259</u>.



Possible deviation from speci- fication	Possible cause of fault	Corrective action
For vehicles without a shut-off valve in front of the evaporator in the A/C unit (for example, the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- or Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541-, depending on the vehicle). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). • The low pressure is too low (lower than the target value)	 malfunctioning. Use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for the A/C System, the A/C Compressor and the Battery Regulator . Not enough refrigerant in refrigerant circuit. The evaporator expansion valve in the A/C unit is faulty. 	tracted is substantially less than specified capacity: - Localize the leak with leak detector and eliminate. - Charge the refrigerant circuit. - Repeat the test. • If quantity of refrigerant experience and eliminate.
 The required cooling out- put is not attained in the evaporator in the A/C sys- tem. 		Charge the refrigerant circuit.Repeat the test.

Possible deviation from speci-Possible cause of fault Corrective action fication For vehicles with a shut-off Activation of the A/C compressor is Extract refrigerant from the valve in front of the evaporamalfunctioning. Use the ⇒ Vehicle Direfrigerant circuit. agnostic Tester in the "Guided Fault tor in the A/C unit (for exam-Finding" Function for the A/C System, the A/C Compressor and the Battery ple, the Hybrid Battery Refrig-The extracted quantity of erant Shut-Off Valve 1 Hybrid refrigerant is considerably Battery Refrigerant Shut-Off Regulator . less than the specified Valve 1 - N516- or Heater and quantity (continue as with Not enough refrigerant in refrigerant A/C Unit Refrigerant Shut-Off vehicles without a shut-off circuit. Valve Heater and A/C Unit valve in front of the evaporator in the A/C unit.) Refrigerant Shut-Off Valve -The evaporator expansion valve in N541-, depending on the vethe A/C unit is faulty. If quantity of refrigerant exhicle). Refer to ⇒ Heating, tracted roughly corresponds Ventilation and Air Condition-Shut-off valve in front of the evaporato specified capacity: ing; Rep. Gr. 87; Refrigerant tor in the A/C unit (for example Hybrid Battery Refrigerant Shut-Off Valve 1 Circuit (vehicle-specific repair Check the activation and manual). Hybrid Battery Refrigerant Shut-Off function of the shut-off valve High pressure normal Valve 1 - N516- or Heater and A/C in front of the evaporator Unit Refrigerant Shut-Off Valve Heatin the A/C unit (for exam-The low pressure is too er and A/Č Unit Refrigerant Shut-Off ple, Hybrid Battery Refrigerlow (lower than the target Valve - N541-, depending on the ant Shut-Off Valve 1 Hybrid valuè) vehicle) is faulty (closed). Refer to **Battery Refrigerant Shut-Off** ⇒ Heating, Ventilation and Air Condi-The required cooling out-Valve 1 - N516- or Heattioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). put is not attained on the er and A/C Unit Refrigerant Shut-Off Valve Heater A/C unit evaporator and on the evaporator for cooland A/C Unit Refrigerant Shut-Off Valve - N541- , deing the high-voltage compending on the vehicle) and ponents. the shut-off valve in front of the evaporator for cooling the high-voltage components (for example, Hybrid **Battery Refrigerant Shut-Off** Valve 2 Hybrid Battery Refrigerant Shut-Off Valve 2 N517- or High-Voltage Battery Heater Core Refrigerant Shut-Off Valve High-Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542-, depending on the vehicle). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 Refrigerant Circuit (vehiclespecific repair manual). Replace the expansion valve in front of the expansion valve in the A/C unit. Protected by copyright. Copying for private or commercial purposes, in part or in wl Replace the expansion uthorised by AUDI AG. AUDI AG does not guarantee or accept valve (or restrictor) in front the correctness of information in this document. Copyright by AU of the evaporator for cooling high-voltage components. Charge the refrigerant circuit.

Repeat the test.





- If no error is detected with this complaint, clean the refrigerant circuit (by flushing with refrigerant R134a, refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93; or clean using compressed air and nitrogen, refer to Refer to ⇒ "5.4 Refrigerant Circuit, <u>Cleaning with Compressed Air and Nitrogen", page 89</u> One of these malfunctions may arise due to a constriction or a blockage in the refrigerant circuit.
- Depending on the vehicle, check the sensor measured value's for the Evaporator Vent Temperature Sensor - G263and, if equipped, the Temperature Sensor before Hybrid Battery Evaporator - G756- and the Temperature Sensor after Hybrid Battery Evaporator - G757- as well as the A/C compressor activation via the respective control modules (for example, the A/C Compressor Control Module - J842- by the Battery Regulation Control Module - J840- or the Climatronic Control Module - J255- A/C control head. Use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" function for the A/C system and battery regulation and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and -> Wiring diagrams, Troubleshooting & Component locations.
- If there is an error in the measured value for the Evaporator Vent Temperature Sensor Evaporator Vent Temperature Sensor - G263- (or, for example, the Temperature Sensor before Hybrid Battery Evaporator Temperature Sensor Before Hybrid Battery Evaporator - G756- or the Temperature Sensor after Hybrid Battery Evaporator Temperature Sensor After Hybrid Battery Evaporator - G757- , depending on the vehicle), this can lead to problems in the cooling output or the evaporator in the A/C unit can ice over. Use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" function for the A/C system and the battery regulation and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- If the A/C system function is not OK after repeating the test, for example after replacing expansion valve (reinstalling the old expansion valve), clean the refrigerant circuit by flushing using the refrigerant R134a, (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R#34a copyright. Copying for private or commercial purposes, in part or in whole, is not page 93), or blowing through using the compressed air and authorised by AUDI AG. AUDI AG does not guarantee or accept any liability nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit," Clean-ing with Compressed Air and Nitrogen", page 89). Then replace the A/C compressor and receiver/dryer or dryer cartridge.
- With a malfunction on one of the temperature sensors, the evaporator may ice up even though the quantity of refrigerant in the circuit is OK.
- If the expansion valve on the evaporator in the A/C unit (or for example the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- / Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541-, depending on the vehicle) is faulty (constantly closed or does not open far enough), the A/C compressor is actuated to maximum output and the low pressure drops to the value in the graph or below (A/C compressor draws off refrigerant from the low pressure side). Since the refrigerant cannot flow via the expansion valve, the cooling output is not attained. High pressure may also not increase or only increase slightly due to the absence of energy. Use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" function for the A/C System and the battery regulation and refer to ⇒ Heating, Ventila-







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tion and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking (vehicle-specific repair manual).

The evaporator in the A/C system has more output than the evaporator for cooling the high-voltage components (depending on the vehicle for example in the battery cooling module or in the high-voltage battery heat exchanger). The shut-off valve (for example, the Hybrid Battery Refrigerant Shut-Off Valve 2 - N517- on the expansion valve in the battery cooling module or the High-Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542-, depending on the vehicle) is currently activated only from or up to a certain battery temperature by the Battery Regulation Control Module - J840- or the Climatronic Control Module - J255- A/C control head (depending on the cooling design for the Electric Vehicle Battery - A2- / Hybrid Battery Unit - AX1- (hybrid battery)), so that the energy exchange via the evaporator for cooling the high-voltage components (in the battery cooling module or in the high-voltage battery heat exchanger) only marginally increases or not at all. Use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" function for the A/C system and battery regulation and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking .



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Possible deviation from specification Possible cause of fault	Corrective action
For vehicles with a shut-off valve in front of the evaporator in the A/C unit (for example, the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516 - or Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541 - , depending on the vehicle). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). * The low pressure is too low (lower than the target value) * The required cooling output is only not attained at the A/C unit evaporator (the cooling output on the evaporator for cooling ithe high-voltage components is OK). * Protected by copyright. Copying for private or comments with respect to the correctness of information in this displacement.	tracted is substantially less than specified capacity Localize the leak with leak detector and eliminate. Charge the refrigerant circuit. Repeat the test. If quantity of refrigerant extracted roughly corresponds to specified capacity: Check the activation and function of the shut-off valve (for example, the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541-, depending on the vehicle). If no fault are public to the responsion valve on the

P	ossible deviation from speci- fication	Possible cause of fault	Corrective action
•	High pressure normal The low pressure is too low (lower than the target value) The required cooling output is only not attained at the evaporator for cooling the high-voltage components (the cooling output at the A/C unit evaporator is OK).	For vehicles with a battery cooling module ◆ Activation or function of the Hybrid Battery Refrigerant Shut-Off Valve 2 - N517-, an adjustment motor, the blower or a temperature sensor in or on the battery cooling module is faulty. ◆ Constriction or blockage in the refrigerant line either to or from the expansion valve on the battery cooling module ◆ Expansion valve for the evaporator for cooling the high-voltage components is faulty. ◆ Not enough refrigerant in refrigerant circuit.	 Check the function and activation of the components for cooling the high-voltage components. Refer to ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" for the air conditioner, the A/C Compressor and the Battery Regulation. Checking refrigerant lines. Extract refrigerant from the refrigerant circuit. Depending on the vehicle, replace the expansion valve with the Hybrid Battery Refrigerant Shut-Off Valve 2 Hybrid Battery Refrigerant Shut-Off Valve 2 Hybrid Battery Refrigerant Shut-Off Valve 2 N517-, for example. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
		For a vehicle with a high-voltage battery heat exchanger ◆ Activation and function of the shut-off valve (for example High-Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542-, depending on the vehicle) for a coolant pump is faulty, or there is a malfunction in the coolant circuit for the high-voltage components. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual). ◆ Constriction or blockage in the refrigerant line to or from the high-voltage battery heat exchanger ◆ Restrictor in the refrigerant line to the high-voltage battery heat exchanger ◆ Not enough refrigerant in refrigerant circuit.	 Check the restrictor in the refrigerant line to the high-voltage battery heat exchanger and if necessary clean or replace. Charge the refrigerant circuit. Repeat the test.

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- On a vehicle with a battery cooling module, to cool the Electric Vehicle Battery - A2- (hybrid battery), for example the Hybrid Battery Refrigerant Shut-Off Valve 2 - N517- is currently activated by the Battery Regulation Control Module · J840- after a specific battery temperature is reached. If the A/C system mode is not already activated at this time, the Electrical A/C Compressor - V470- is activated via the A/C Compressor Control Module - J842- by the Battery Regulation Control Module Battery Regulation Control Module - J840- . The temperature of the air in front of and behind the evaporator in the battery cooling module is determined by the Battery Regulation Control Module Battery Regulation Control Module - J840- . If it can be determined that there is insufficient cooling, then the information is stored in the Battery Regulation Control Module Battery Regulation Control Module - J840- . Use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for the A/C System, the A/C Compressor and the Battery Regulation and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- On a vehicle with a battery cooling module, the temperature of the air (as well as the evaporator cooling output) in the battery cooling module is determined via the installed temperature sensor (it currently cannot be measured using a thermometer while operating) and may only be checked using the Guided Fault Finding. Refer to ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" Function for the A/C System, the A/C Compressor and the Battery Regulation.
- On a vehicle with a battery cooling module pay attention to the additional notes. Refer to ⇒ page 259
- On a vehicle with a high-voltage battery heat exchanger and depending on the vehicle (for example on the Audi A3 e-tron, the name of components may vary on other vehicles), to cool the high-voltage battery (for example the Electric Vehicle Battery - A2-, High-Voltage Battery Charger Control Module - J1050-, etc.), the High-Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542- is no longer activated by the Climatronic Control Module - J255- starting at a certain temperature (the High-Voltage Battery Heater Core Refrigerant Shut-Off Valve High-Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542- is open without power). If the A/C system driver is not already activated at this time, the Electrical A/C Compressor - V470- is activated via the A/C Compressor Control Module - J842- by the Climatronic Control Module Climatronic Control Module - J255- . So that the high-voltage battery is actually cooled by the coolant, additional circuit components must also be activated (for example the Engine Coolant Circulation Pump 2 - V178- and the Solenoid Valve 1 - N88-) and coolant must be flowing through the high-voltage battery heat exchanger. If it can be determined that there is insufficient cooling of the high-voltage components, this information will be stored in various control modules. Use the ⇒ Vehicle Protecte Diagnostic Tester in the "Guided Fault Finding" function for mittine A/C system A/C compressor and battery regulation and refer to ⇒ Heating, Ventilation and Air Conditioning, Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and ⇒ Rep. Ğr. 19 ; Cooling System/Coolant; Connection Diagram - Coolant Hoses .
 - If no error is detected with this complaint, clean the refrigerant circuit (by flushing with refrigerant R134a, refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93; or clean using compressed

air and nitrogen, refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).

One of these malfunctions may arise due to a constriction or a blockage in the refrigerant circuit.

Possible devia- ion from specifi- cation	Possible cause of fault	Corrective action	
For vehicles with a shut-off valve in front of the evaporator in the A/C unit (for example, the Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- or Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541-, depending on the vehicle). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual). High pressure does not increase or only increases slightly above pressure with engine stopped. Low pressure does not drop or drops only slightly. The required cooling output is not attained in the A/C unit evaporator.	No activation of the A/C compressor, the A/C compressor is not driven. Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516-or Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541- is faulty (closed), depending on the vehicle. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).	(for example, the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve	by copyright. Copying for private or commercial purposes, in part or in who unless authorised by AUDI AG. AUDI AG does not guarantee or accept an elect to the correctness of information in this document. Copyright by AUD

evaporator and in the evaporator for cooling the high-voltage components.

Possible deviation from specification	Possible cause of fault	Corrective action
	◆ Constriction or obstruction in refrigerant circuit (for example, inside the refrigerant line between the service connection "low pressure side" and the A/C compressor).	- Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to \$ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to \$ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).
		 Replace the hose or pipe if kinked or constricted.
	 A/C compressor faulty. 	 Replace the A/C compressor.



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Possible deviation from Possible cause of fault Corrective action specification For vehicles without a shut-A/C compressor activation or Check the activation and the funcoff valve in front of the evapfunctionality malfunctioning. tion of the A/C compressor and service it. Use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault orator in the A/C unit (for Constriction or obstruction in reexample, the Hybrid Battery frigerant circuit. Refrigerant Shut-Off Valve Finding" Function for the A/C System and Battery Regulation . 1 Hybrid Battery Refrigerant Expansion valve malfunctioning. Shut-Off Valve 1 - N516- or Heater and A/C Unit Refrig-Run hand over refrigerant circuit erant Shut-Off Valve Heatto check for differences in temperaer and A/C Unit Refrigerant ture. Shut-Off Valve - N541-, depending on the vehicle). Re-If difference in temperature is found fer to ⇒ Heating, Ventilation at one component: and Air Conditioning; Rep. Replace the hose or pipe if kinked Gr. 87; Refrigerant Circuit or constricted. (vehicle-specific repair manual). In the event of an obstruction, clean High pressure increases refrigerant circuit by flushing with above specification refrigerant R134a (refer to Refer to Low pressure quickly 5.5 Refrigerant Circuit, Cleaning drops to specified value, (Flushing) with Refrigerant R134a", page 93), or blowing through with The required cooling outcompressed air and nitrogen (refer put is not attained in the to Refer to ⇒ "5.4 Refrigerant Cir-A/C unit evaporator and cuit, Cleaning with Compressed Air in the evaporator for cooland Nitrogen", page 89). ing the high-voltage components. Charge the refrigerant circuit. Repeat the test. The function is not OK and no malfunction is determined: Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ≥ <u> "5.4 Refrigerant Circuit, Cleaning</u> with Compressed Air and Nitrogen", page 89). Charge the refrigerant circuit. g for private or commercial purposes, in part or in whole Protected by copyright, Copyin permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any Repeat the test if the function is not with respect to the correctness of information in this document. Copyright by AUDI A OK: Replace the expansion valve in front of the evaporator in the A/C unit and the receiver/dryer.



Possible deviation from specification	Possible cause of fault	Corrective action
valve in front of the evaporator in the A/C unit (for example, the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- or Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541-, depending on the vehicle). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). • High pressure increases above specification	 Activation or function of the A/C compressor or a shut-off valve (for example, the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- or the Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541-, depending on the vehicle) is faulty. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). Constriction or obstruction in refrigerant circuit. Expansion valve malfunctioning. 	
put is not attained in the A/C unit evaporator and in the evaporator for cooling the high-voltage components.		

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- If the A/C system function is not OK when the test is repeated, replace the expansion valve and receiver/dryer (and the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- / Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541- , if equipped). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- With this malfunction, evaporator may ice up although the quantity of refrigerant in circuit is OK.
- If the expansion valve on the evaporator in the A/C unit or the shut-off valve (for example, the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- or Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541-) is faulty (constantly closed or does not open far enough), the A/C compressor is actuated to maximum output and the low pressure drops to the specified value or below (A/C compressor draws off refrigerant from the low pressure side). Since no (or little) refrigerant can flow via the expansion valve (or the corresponding shut-off valve), the cooling output is not attained. The high pressure may not increase or only increase slightly due to the absence of energy. Use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" function for the A/C System and Battery Regulation and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking (vehicle-specific repair manual).
- If, in a vehicle with a battery cooling module, the expansion valve on the evaporator in the battery cooling module is faulty (or if the function or activation of the Hybrid Battery Refrigerant Shut-Off Valve 2 - N517- is malfunctioning), constantly closed or does not open enough, then the A/C compressor is also activated with the maximum output (the required temperatures in the battery cooling module are not attained). The pressure on the low pressure side only falls to the specified value or lower when there is no cooling output requested at the same time in the A/C unit (the shut-off valve in front of the evaporator in the A/C unit for example the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- is activated and is closed). The A/C compressor extracts the refrigerant from the low pressure side from both evaporators). Since, however, no refrigerant can flow over the expansion valve in the A/C unit (for example the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 -N516-) and the cooling output in the battery cooling module is not attained (there is a malfunction in the battery cooling module), the electrical A/C compressor will be activated with a higher speed. Since, however, none of the refrigerant can flow through, the pressure on the low pressure side falls below the target value. In addition, the high pressure may not or only slightly increase, due to the absence of energy. Use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" function for the A/C System and Battery Regulation and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and ⇒ Heating, Ventilation and Air Conditioning, Rep. Gr. 00 ; Repair Instructions; Cooling Output, Checking (vehicle-specific repair manual).



- If, on a vehicle with a high-voltage battery heat exchanger, the restrictor installed in the refrigerant line to the high-voltage battery heat exchanger is plugged or the shut-off valve (for example, the High-Voltage Battery Heater Core Refriger-`ant Shut-Off Valve - N542- on the Audi A3 e-tron) installed in this line is faulty, constantly closed, or does not open wide enough, then the A/C compressor is also activated with the maximum output (the required temperatures in the battery cooling module are not attained). The pressure on the low pressure side only falls to the specified value or lower when there is no cooling output requested at the same time in the A/C unit (the Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Ŏff Valve - N541- is activated and is closed on the Audi A3 e-tron, for example). The A/C compressor extracts the refrigerant from the low pressure side from both evaporators). Since, however, no refrigerant can flow via the expansion valve in the A/C unit (via the shut-off valve, for example the Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541-) and the cooling output in the highvoltage battery heat exchanger is not attained, the electrical A/C compressor is activated with a higher speed. Since, however, none of the refrigerant can flow through, the pressure on the low pressure side falls below the target value. In addition, the high pressure may not or only slightly increase, due to the absence of energy. Use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" function for the A/C System and Battery Regulation and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking (vehicle-specific repair manual). The same also applies when a malfunction occurs in the coolant circuit in which the high-voltage battery heat exchanger is installed (for example, the Engine Coolant Circulation Pump 2 - V178- or the Solenoid Valve 1 - N88- on the Audi A3 e-tron are not correctly activated or are faulty). The high-voltage battery heat exchanger is then cooled, but the cooled coolant does not reach the high-voltage components. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Coolant Circuit (vehicle-specific repair manual) and ⇒ Rep. Gr. 19; Cooling System/Coolant; Connection Diagram - Coolant Hoses .
- Since the evaporator output for cooling the high-voltage components is smaller than the evaporator output in the A/C unit, the required specified temperature may still be reached in the evaporator for cooling the high-voltage components with too little refrigerant in the circuit, but the specified temperature in the A/C unit evaporator will no longer be attainable (even if the A/C compressor is activated with increased speed).
- If there is too much refrigerant oil in the circuit, the compressor must be drained (flushed) and the receiver/drver or drver cartridge must be replaced. After cleaning the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ≥ R134a", page 93), or blowing through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89), fill the circuit with the correct quantity of refrigerant oil (in the A/C compressor). Refer to Refer to ⇒ "10.2 Approved" Refrigerant Oils and Refrigerant Oil Capacities", page 360

Possible deviation from specification	Possible cause of fault	Corrective action
 High and low pressure normal at first after some time, High pressure increases above specification, The low pressure decreases to the target value or lower, The required cooling output is not attained in the A/C unit evaporator and in the evaporator for cooling the high-voltage components. 	 Activation or function of the A/C compressor or the shut-off valve (for example, the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- or the Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541-, depending on the vehicle) is faulty. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). Moisture in refrigerant circuit 	 Check the activation of the A/C compressor and the shut-off valve (for example, the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- or the Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541-). Use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" function for the A/C System and Battery Regulation .
		- Clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).
High and low pressure normal at first,	A	 Replace the receiver/dryer with dryer.
After lengthy driving time, low pressure drops exces- sively (evaporator in the A/C unit ices up). Protect permit with	ed by copyright. Copying for private or commercial purposes, in ped unless authorised by AUDI AG. AUDI AG does not guarantee respect to the correctness of information in this document. Copy	Evacuate the refrigerant circuit for at least three hours. Charge the refrigerant circuit by the property of the pro
		 Repeat the test.





- It is not initially necessary to clean the refrigerant circuit by flushing using refrigerant R134a (refer to Refer to ≢ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blow through using compressed air and nitrogen (refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89 when this problem occurs since normally, there is only a small quantity of moisture in the system which can be removed by lengthy evacuation.
- If a problem involving moisture in refrigerant circuit only oc-Protecurs after a lengthy operating period or only infrequently (low per pressure drops below specification and evaporator ices up), wit is sufficient to replace the dryer installed in receiver/dryer (adjust quantity of refrigerant oil). Refrigerant circuit is then to be evacuated for at least three hours.
- With this malfunction, evaporator may ice up although the quantity of refrigerant in circuit is OK.
- Likewise, the refrigerant circuit may become iced if there is a malfunction on the Evaporator Vent Temperature Sensor - G263- or / and on the Temperature Sensor after Hybrid Battery Evaporator - G757- (depending on the vehicle). For this complaint, also pay attention to the measured value of the Evaporator Vent Temperature Sensor Evaporator Vent Temperature Sensor - G263- and the Temperature Sensor after Hybrid Battery Evaporator Temperature Sensor After Hybrid Battery Evaporator - G757- (on vehicles with a battery cooling module, for example). Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function for the A/C system, and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. '00 ; Repair Instructions; Checking Cooling Output (vehicle-specific repair manual).



 High pressure is too low, The required cooling on the shut-Off Valve of the valves (for example, the shut-Off Valve put is not attained in the AC unit evaporator and in the evaporator and in the evaporator for cooling the high-voltage components. Hybrid Battery Refrigerant Shut-Off Valve 2 Hybrid Battery Refrigerant Shut-Off Valve 1 N516 - Hybrid Battery Refrigerant Shut-Off Valve 1 High-Voltage Battery Heater and A/C Unit Refrigerant Shut-Off Valve High-Voltage Battery Heater Core Refrigerant Shut-Off Valve 2 - N547 - Heater and A/C Unit Refrigerant Shut-Off Valve Shut-Off Valve 1 N541 - or the High-Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542 - depending on the vehicle is faulty. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). The AC unit expansion valve or in the battery cooling module (if applicable) is faulty. The expansion valve in the AC unit is faulty or, if equipped, the restrictor in the refrigerant line to the high-voltage battery heat exchanger is plugged. A/C compressor faulty. The expansion valve in the AC unit is faulty or, if equipped, the restrictor in the refrigerant line to the high-voltage battery heat exchanger is plugged. A/C compressor faulty. The expansion valve or in the part of the AC or of the





- For the malfunction "high pressure normal, low pressure too low", note the following: With this fault, it may be that the evaporator in the A/C unit is icing up although the refrigerant quantity in the circuit is OK.
- If there is a fault in the A/C compressor (the A/C compressor is activated by the A/C Compressor Control Module - J842at too high of a speed), it is not necessary to clean the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flusi Protected Refrigerant R134a", page 93); or blowing through it with permitte compressed air and nitrogen (refer to Refer to 15.4 Refrigwith rerains Circuit, Cleaning with Compressed Air and Nitrogen", page 89). In this case, it is sufficient to replace the A/C compressor (observe quantity of refrigerant oil in A/C compressor and if necessary adjust).
 - If, on a vehicle with a battery cooling module, the expansion valve for the A/C unit evaporator or the expansion valve for the evaporator in the battery cooling module is faulty (constantly closed or does not far enough), the A/C compressor is also actuated to maximum output and the pressure on the low pressure side drops to value in graph or below (A/C compressor draws off refrigerant from low-pressure side). Since the refrigerant cannot flow via the faulty expansion valve, the cooling output in the downstream evaporator is not attained and the high pressure may also not increase or only increase slightly due to the absence of energy. The A/C compressor may thereby be activated with a higher speed since the required cooling output is not attained in an evaporator. The same also applies if the function or activation of a shut-off valve (for example, the Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- or the Hybrid Battery Refrigerant Shut-Off Valve 2 - N517-, depending on the vehicle) is faulty. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function for the A/C system, and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking (vehicle-specific repair manual).
 - If, on a vehicle with a high-voltage battery heat exchanger, the expansion valve for the evaporator in the A/C unit is faulty (constantly closed or does not open far enough), or the restrictor in the refrigerant line to the high-voltage battery heat exchanger is plugged, the A/C compressor is also actuated to maximum output and the pressure on the low pressure side drops to value in graph or below (A/C compressor draws off refrigerant from the low-pressure side). Since the refrigerant cannot flow via the faulty expansion valve or the plugged restrictor, the cooling output in the downstream evaporator is not attained and the high pressure may also not increase or only increase slightly because no energy turnover is present. The A/C compressor may thereby be activated with a higher speed since the required cooling output is not attained in an evaporator. The same also applies it the function or activation of a shut-off valve (for example, the Heater and A/C Unit Refrigerant Shut-Off Valve - N541- or the High-Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542-, depending on the vehicle) or one of the components installed in the coolant circuit for the high-voltage components (for example, the Engine Coolant Circulation Pump 2 - V178- or the Solenoid Valve 1 - N88- on the Audi A3 e-tron, depending on the vehicle) is faulty. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function for A/C system, and refer to ⇒ Rep. Gr. 19; Cooling



System/Coolant; Connection Diagram - Coolant Hoses and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

Check the measured values of the Evaporator Vent Temperature Sensor - G263- (and if equipped, the measured values of the Temperature Sensor Before Hybrid Battery Evaporator - G756- and the Temperature Sensor after Hybrid Battery Evaporator - G757-, depending on the vehicle) as well as the activation of the A/C compressor from the Battery Regulation Control Module - J840- or from the A/C system control head, the Climatronic Control Module - J255or from the Front A/C Display Control Head - E87- or from the Thermal Management Control Module - J1024- (depending on the vehicle). If the measured value of the Evaporator Vent Temperature Sensor Evaporator Vent Temperature Sensor - G263- (the Temperature Sensor Before Hybrid Battery Evaporator Temperature Sensor Before Hybrid Battery Evaporator - G756- or the Temperature Sensor after Hybrid Battery Evaporator Temperature Sensor After Hybrid Battery Evaporator - G757-, depending on the vehicle) or the activation of the A/C compressor is faulty, the evaporator can freeze-up or the required cooling output is not reached. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function of the A/C system, and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking (vehicle-specific repair manual).



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Possible deviation from specification	Possible cause of fault	Corrective action
 High pressure normal or too high, Low pressure is too high, A/C compressor noise (particularly after switch-on), The required cooling out-put is not attained in the A/C unit evaporator and / or in the evaporator for cooling the high-voltage components. 	not gua N542π (depending on the vehicle)	 Check the activation and function of the A/C compressor and, if equipped, these shut-off valves (the Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516-, Hybrid Battery Refrigerant Shut-Off Valve 2 Hybrid Battery Refrigerant Shut-Off Valve 2 - N517-, Heater and A/C Uni Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve - N541-, and the High-Voltage Battery Heater Core Refrigerant Shut-Off Valve High-Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542-, depending on the vehicle). Use the ⇒ Vehicle Diagnostic Tester in the "Guided Fault Finding" function of the A/C system and battery regulation and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual). Extract refrigerant from the refrigerant circuit. If quantity of refrigerant extracted roughly corresponds to specified capacity: Replace the expansion valve for the evaporator in the A/C unit as well as in the receiver/dryer / dryer. Replace the expansion valve with the Hybrid Battery Refrigerant Shut-Off Valve 2 Hybrid Battery Refrigerant

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Possible deviation from specification	Possible cause of fault	Corrective action
		greater than specified ca- pacity:
		Charge the refrigerant cir- cuit.
		 Repeat the test.



- This fault may also be caused by too much refrigerant oil in the circuit. Overfilling with refrigerant oil can occur if, for example, the compressor has been replaced without adjusting the quantity of refrigerant oil.
- If, on a vehicle with a battery cooling module, the expansion valve for the A/C unit evaporator or the expansion valve for the evaporator in the battery cooling module is faulty (constantly closed or does not far enough), the A/C compressor is also actuated to maximum output and the pressure on the low pressure side drops to value in graph or below (A/C compressor draws off refrigerant from low-pressure side). Since the refrigerant cannot flow via the faulty expansion valve, the cooling output in the downstream evaporator is not attained and the high pressure may also not increase or only increase slightly due to the absence of energy. The A/C compressor may thereby be activated with a higher speed since the required cooling output is not attained in an evaporator. The same also applies if the function or activation of a shut-off valve (for example, the Hybrid Battery Refrigerant Shut-Off Valve 1 - N516- or the Hybrid Battery Refrigerant Shut-Off Valve 2 - N517-, depending on the vehicle) is faulty. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function for the A/C system, and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual)
- If, on a vehicle with a high-voltage battery heat exchanger, the expansion valve for the evaporator in the A/C unit is faulty (constantly closed or does not open far enough), or the restrictor in the refrigerant line to the high-voltage battery heat exchanger is plugged the A/C compressor is also actuated to maximum output and the pressure on the low press are does not guarantee or accept any liability sure side drops to value in graph or below (A/C compres-in this document. Copyright by AUDI AG. sor draws off refrigerant from the low-pressure side). Since the refrigerant cannot flow via the faulty expansion valve or the plugged restrictor, the cooling output in the downstream evaporator is not attained and the high pressure may also not increase or only increase slightly because no energy turnover is present. The A/C compressor may thereby be activated with a higher speed since the required cooling output is not attained in an evaporator. The same also applies if the function or activation of the Heater and A/C Unit Refrigerant Shut-Off Valve - N541- , the High-Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542- (for example, on the Audi A3 e-tron) or one of the components installed in the coolant circuit for the high-voltage components (for example, the Engine Coolant Circulation Pump 2 - V178- or the Solenoid Valve 1 - N88- on the Audi A3 e-tron) is faulty. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function for A/C system , and refer to ⇒ Rep. Gr. 19 Cooling System/Coolant; Connection Diagram - Coolant Hoses and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



Possible deviation from speci- fication	Possible cause of fault	Corrective action
 High and low pressure normal, The required cooling output is not attained in the A/C unit evaporator and in the evaporator for cooling the high-voltage components. 	 Depending on the version of the refrigerant circuit, the activation or function of one of these shut-off valves (for example, Hybrid Battery Refrigerant Shut-Off Valve 1 Hybrid Battery Refrigerant Shut-Off Valve 1 - N516-, Hybrid Battery Refrigerant Shut-Off Valve 2 Hybrid Battery Refrigerant Shut-Off Valve 2 Hybrid Battery Refrigerant Shut-Off Valve 2 - N517-, Heater and A/C Unit Refrigerant Shut-Off Valve Heater and A/C Unit Refrigerant Shut-Off Valve Heater Core Refrigerant Shut-Off Valve High-Voltage Battery Heater Core Refrigerant Shut-Off Valve - N542-, depending on the vehicle) is faulty. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). Too much refrigerant in the circuit. Expansion valve malfunctioning. 	rantee or accept any liability

Possible deviation from specification	Possible cause of fault	Corrective action
High and low pressure normal,		Fill in correct quantity of re- frigerant oil into circuit (see
A/C compressor noise (particularly after switch- on),		note). - Charge the refrigerant circuit.
The required cooling out- put is not attained in the A/C unit evaporator (and /		Repeat the test if the function is not OK:
or in the evaporator for cooling the high-voltage components).		 Replace the expansion valve.
		Charge the refrigerant circuit.
		 Repeat the test.



- Overfilling with refrigerant oil can occur if, for example, the compressor has been replaced without adjusting the quantity of refrigerant oil.
- If, for example, the expansion valve in the evaporator in the A/C unit is faulty (permanently open), the evaporator temperature (in the A/C unit) is no longer regulated such that only refrigerant leaves the evaporator in a gaseous state. Under certain usage conditions, liquid droplets may then be drawn in by the compressor and cause noise (liquid cannot be compressed).
- If there is too much refrigerant oil in the circuit, the compressor must be drained and the receiver/dryer must be replaced. After cleaning the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page <u>93</u>), fill the refrigerant circuit with the correct quantity of refrigerant. Refer to Refer to ⇒ "10.2 Approved Refrigerant" Oils and Refrigerant Oil Capacities", page 360.



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8.6.2 Specified Values for Refrigerant Circuit Pressures, Vehicles with Heat Pump



Note

- On vehicles with a high-voltage system and heat pump (for example on the Audi Q7 e-tron) installed in the refrigerant circuit and electrically activated vehicles which regulate the flow of the refrigerant in the refrigerant circuit depending on the current operating condition. There are different versions of these valves. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and use the ⇒ Vehicle diagnostic tester in the "Ġuided Faulť Finding" function.
- For vehicles with the "heat pump" function and/or "high-voltage battery cooling", high pressure is not at the high pressure side service connection in every A/C system operating condition. Depending on the A/C system operating condition, the refrigerant circuit pressure on the high pressure side can only be measured via the pressure / temperature sensor installed in the refrigerant circuit on these vehicles. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.
- On these vehicles, the A/C system refrigerant circuit is used not only to cool the vehicle interior but also to cool the Hybrid Battery Unit - AX1- (via the refrigerant circuit for the high-voltage system) and to heat the vehicle interior (at low ambient temperature) via the heat pump function. So in order for these functions to be performed, the various valves, pressure and temperature sensors as well as the pumps in the refrigerant circuit and in the high-voltage system coolant circuit must be installed correctly and function correctly. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and ⇒ Engine Mechanical; Rep. Gr. 19; Cooling System/Coolant; Coolant, Draining and Filling .
- To determine the possible cause of a malfunction, the basic setting of the Thermal Management Control Module Thermal or commercial purposes, in part or in whole, is not Management Control Module - J1024c different Coutines are. AUDI AG does not guarantee or accept any liability stored, which activate these functions "Cooling the A/C sys-mation in this document. Copyright by AUDI AG. tem", "heat pump", and "Cooling the components of the high-voltage system". Using the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

High-Pressure Side:

Increasing from initial pressure (when connecting the pressure gauges) to a maximum of 20 bar (290.08 psi).



Note

Depending on the layout of the high pressure side service connection and the operating condition, the high pressure can only be measured via the pressure / temperature sensor installed in the refrigerant circuit. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



Low-Pressure Side:

Decreasing from initial pressure (when connecting the pressure gauges) to a value between 1.5 and 2.3 bar (21.76 and 33.36 psi) absolute pressure (depending on the required cooling out-

A/C Compressor Speed:

Depending on the required cooling output between 800 and 8600 /min (currently a maximum of 5000/min for parked vehi-



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- The temperature of the air downstream of the evaporator, the current A/C compressor speed and the pressure of the refrigerant on the high pressure side are displayed as the measured value by various control modules (for example, by the Thermal Management Control Module - J1024- , the Front A/C Display Control Head - E87- or the Climatronic Control Module - J255-), depending on the vehicle. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.
- If a high cooling output is required (for example, a high outside temperature and the blower speed set on high), then the A/C compressor will not bring the pressure on the low pressure side to the required value (for example, for a certain time after turning on the A/C). The A/C compressor is not actuated at the maximum specified speed (of approximately 8500/min) on a stationary or slow moving vehicle (up to a speed of approximately 45km/h (28 mph)) (the A/C compressor speed is limited to approximately 5000/min). After a vehicle reaches a speed of more than approximately 45 km (28 miles) /h, the limit for the maximum permissible A/C compressor speed is lifted. At a A/C compressor speed of 5000 RPM, a high outside temperature and a high fresh air blower speed (inefficient environmental controls), the A/C compressor output (the delivery volume) is no longer sufficient to reduce the pressure on the low pressure side to the target value. To check the A/C compressor control under these conditions, for example, the fresh air blower is activated only with approximately 40% of the maximum voltage, check the pressures at a lower fresh air blower speed. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function for A/C system and the battery regulation and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Checking Cooling Output (vehicle-specific repair manual).
- Under unfavorable conditions (very high ambient temperatures, high humidity), pressure on high-pressure side may increase to maximum 29 bars (420.61 psr)g for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability
- The specified speed of the A/C compressor is displayed as cument. Copyright by AUDI AG. the measured value, for example, from the Thermal Management Control Module - J1024- using the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.
- The refrigerant circuit pressure (low or high pressure) measured by the different pressure / temperature sensors depending on the respective operating condition is displayed as the measured value by the respective control module. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- The low pressure settles depending on the A/C compressor speed and the control characteristic of the expansion valve (on the evaporator of the front heater and A/C unit) within the compressor output range in tolerance range (1.5 to 2.3 bar (21.76 to 33.36 psi) positive pressure).
- The specified speed of the A/C compressor must for this test be greater than 1500 RPM.
- In setting "maximum cooling output" the target speed is regulated to approximately 4000 up to 5000 /min. This value is vehicle-specific and is displayed and the measured value

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of the respective control module using the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

- At absolute pressure, 0 bar (0 psi) corresponds to absolute vacuum. Normal ambient pressure corresponds to 1 bar (14.5 psi) absolute pressure. 0 bar (0 psi) pressure corresponds to an absolute pressure of 1 bar (14.5 psi) on most pressure gauges (indicated by -1 bar (-14.5 psi) below 0).
- If on a vehicle with two evaporators (one in the heater and A/C unit and one for cooling the heater and A/C unit for example the heat exchanger for the high-voltage battery) and two condensers (one in the front end for the A/C system and one as the heat exchanger for the heat pump function) depending on the selected function on a component, the measured temperature or pressure corresponds to the specified value on another component whose specifications are not achieved, check the activation of the electrically activated valves installed in the refrigerant circuit. At the same time, also pay attention to the pressure distribution in the refrigerant circuit depending on the installed check valves. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- For the correct A/C function it is also necessary that, depending on the selected functions of the respective heater cores, enough heat is supplied or removed. Therefore also pay attention to the incorporation of the heater core into the respective coolant circuit for the engine and high-voltage system and the function of the pumps and valves installed in it. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault" Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Coolant Circuit (vehicle-specific repair manual).
- Since the evaporator for cooling the high-voltage components output (in the battery cooling module and in the highvoltage battery heat exchanger) is smaller than the evaporator output in the heater and A/C unit, the required target temperature may still be reached in the evaporator for cooling the high-voltage battery with too little refrigerant in the refrigerant circuit, but the target temperature in the heater and A/C unit evaporator will no longer be attainable (even though the A/C compressor is activated with increased A/C unit speed).



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Possible deviation from specification	Possible cause of fault	Corrective action
High pressure remains constant or increases on- ly slightly (above pressure)	 Not enough refrigerant in refrigerant circuit. 	Extract refrigerant from the refrigerant circuit.
with engine stopped), • Low pressure quickly		If quantity of refrigerant ex- tracted is substantially less than specified capacity:
drops to specified value or lower. • The required cooling out-		Localize the leak with leak detector and eliminate.
put is not attained in the A/C unit evaporator and in the evaporator for cool-		Charge the refrigerant circuit.
ing the high-voltage components.		 Repeat the test.
,		If quantity of refrigerant ex- tracted roughly corresponds to specified capacity:
		 Check the activation and function of the A/C com- pressor and the valves in- stalled in the refrigerant cir-
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	◆ Activation of the A/G₅compressor₀is₅s of i faulty.	function of the A/C compressor using the ⇒ Vehicle diagnostic tester in "Guided Fault Finding" function.
 High pressure normal Low pressure corresponds to the specified value, The requested cooling output is not attained. 	♦ If one of the valves installed in the refrigerant circuit is faulty or does not work correctly. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle- specific repair manual).	 Check the function and activation of the various valves installed in the refrigerant circuit via the pressure distribution in the refrigerant circuit. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual).
	 Not enough refrigerant in refrigerant circuit. 	Discharge the refrigerant circuit and charge again (see above).
	 The shut-off valve in front of the ex- pansion valve for the evaporator in the front heater and A/C unit is faulty. 	- Repeat the test.
	 The expansion valve for the evaporator in the front heater and A/C unit is faulty. 	 Check the shut-off valve. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
		Replace the expansion valve.



- To determine the possible cause of a malfunction, the basic setting of the respective control module (for example in the Thermal Management Control Module Thermal Management Control Module - J1024-) different routines are stored, which activate these functions "Cooling the A/C system", "heat pump", and "Cooling the components of the high-voltage system", using the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.
- If for this concern, no malfunction can be determined, check the activation of the electrically activated valves installed in the refrigerant circuit next. If no error can be detected here, remove and check the check valves installed in the refrigerant circuit. If no error can be detected here either, clean the refrigerant circuit (flush with refrigerant R134a) A constriction or blockage in the refrigerant circuit can also lead to these complaints. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and Refer to ⇒ "5.5 Refrigerant" Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93.
- For vehicles with the "heat pump" function and/or "high-voltage battery cooling", high pressure is not at the high pressure side service connection in every A/C system operating condition. Depending on the A/C system operating condition, the refrigerant circuit pressure on the high pressure side can only be measured via the pressure / temperature sensor installed in the refrigerant circuit on these vehicles. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.
- Before beginning the repair work check the measured values of the different pressure / temperature sensors installed in the refrigerant circuit. If there is an error in the measured value of a pressure / temperature sensor, this can lead to problems in the cooling output, or the evaporator in the front heater and A/C unit can ice over. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual), and ⇒ Wiring diagrams, Troubleshooting & Component locations.
- When checking the different functions (heat pump or cooling the high-voltage battery), also pay attention to the activation and function of the coolant circuit components that are involved with these functions. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Coolant Circuit (vehiclespecific repair manual).
- If the A/C system function is not OK after repeating the test, for example after replacing expansion valve (reinstalling the old expansion valve), clean the refrigerant circuit by flushing using the refrigerant R134a.Refer to Refer to 😑 "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant
 R134a" Page 93: PThen replace the A/C compressor and or in whole, is not received by high properties and by the second and liability and second and liability receiver/driver or driver cartinidge! AG. AUDI AG does not guarantee.
- With a malfunction on one of the temperature sensors, the evaporator may ice up even though the quantity of refrigerant in the circuit is OK.
- If the expansion valve on the evaporator in the A/C unit is faulty (constantly closed or does not open far enough), the A/C compressor is activated to maximum output and the low



pressure drops to the value in the graph or below (A/C compressor draws off the refrigerant from the low pressure side). Since the refrigerant cannot flow via the expansion valve, the cooling output is not attained, high pressure may also not increase or only increase slightly due to the absence of energy. Use the ⇒ Vehicle diagnostic tester in the "Guided" Fault Finding" function and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Checking Cooling Output (vehicle-specific repair manual).

- The evaporator in the heater and A/C unit has a larger output than the evaporator for cooling the high-voltage battery. Depending on the version to cool the Electric Vehicle Battery - Á2- / Hybrid Battery Unit - AX1- (hybrid battery), the expansion valve in front of this evaporator (the heat exchanger for cooling the high-voltage system components) is currently activated only from or up to a certain battery temperature by the respective control module, so that the exchange of energy via this evaporator does not increase, or only slightly. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Checking Cooling Output (vehicle-specific repair manual).
- If there is too much refrigerant oil in the circuit, the compressor must be drained (flushed) and the receiver/dryer or dryer cartridge must be replaced. After cleaning the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93), fill the refrigerant circuit with the correct quantity of refrigerant (in the A/C compressor). Refer to Refer to ⇒ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities", page 360.

P	ossible deviation from speci- fication		Possible cause of fault		Corrective action	
•	High pressure normal	•	Not enough refrigerant in refrigerant	-	Extract refrigerant from the	
•	Low pressure normal or too low (less than the specified value)		circuit.	•	refrigerant circuit. If quantity of refrigerant extracted is substantially less	
•	The required cooling out-				than specified capacity	
	put is only not attained at the A/C unit evaporator (the cooling output on the			_	Localize the leak with leak detector and eliminate.	
	evaporator for cooling the high-voltage components is OK).				-	Charge the refrigerant circuit.
	,			Ŧ	Repeat the test.	
				•	If quantity of refrigerant extracted roughly corresponds to specified capacity:	
				_	Check the activation and function of the A/C compressor and the valves installed in the refrigerant circuit (see below).	

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Possible deviation from specification	Possible cause of fault	Corrective action
	 Activation of the A/C compressor is faulty. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function. The expansion valve for the evaporator in the front heater and A/C unit is faulty. 	 Check the activation and function of the A/C com- pressor using the ⇒ Vehicle diagnostic tester in "Guided Fault Finding" function.
Au	♦ If one of the valves installed in the refrigerant circuit is faulty or does not work correctly. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle- specific repair manual).	 Check the function and activation of the various valves installed in the refrigerant circuit via the pressure distribution in the refrigerant circuit. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual).
Protected by copyright. Copying for private or opermitted unless authorised by AUDI AG. AUI with respect to the correctness of information	The shut-off valve in front of the expansion valve for the evaporator in the front heater and A/C unit is faulty. The expansion valve for the evaporator in the front heater and A/C unit is faulty.	 Check the shut-off valve. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). Replace the expansion valve. Charge the refrigerant circuit. Repeat the test.



Read the supporting information. Refer to <u>⇒ page 284</u>.



Possible deviation from specification	Possible cause of fault	Corrective action
 High pressure normal Low pressure normal or too low (less than the specified value) The required cooling output is only not attained at the evaporator for cooling the high-voltage components (the cooling output at the heater and the front A/C unit evaporator is OK). 	 If one of the valves installed in the refrigerant circuit is faulty or does not work correctly. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). One of the pumps or one of the valves in the high-voltage system coolant circuit is faulty or does not function correctly. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Coolant Circuit (vehicle-specific repair manual). 	 Check the function and activation of the various valves installed in the refrigerant circuit via the pressure distribution in the refrigerant circuit. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual). Check the function and activation of the components responsible for cooling the high-voltage components. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.
	 Constriction of blockage in the refrigerant line to or from the expansion valve on the evaporator for cooling the high-voltage components. Expansion valve for the evaporator for cooling the high-voltage components is faulty. 	 Extract refrigerant from the refrigerant circuit. Clean or replace the refrigerant line to the expansion valve if necessary. Charge the refrigerant circuit. Repeat the test.



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Read the supporting information. Refer to <u>⇒ page 284</u>.



	D 111 6	
Possible devia- tion from specifi- cation	Possible cause of fault	Corrective action
 High pressure does not increase or only increases slightly above pressure with engine stopped. Low pressure does not drop or drops only slightly. The required cooling output is not attained in the A/C unit evaporator and in the evaporator for cooling the high-voltage components. 	 No activation of the A/C compressor, the A/C compressor is not driven. If one of the valves installed in the refrigerant circuit is faulty or does not work correctly. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). 	 Check the activation and function of the A/C compressor and service using the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function. Check the function and activation of the various valves installed in the refrigerant circuit via the pressure distribution in the refrigerant circuit. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
	◆ Constriction or obstruction in refrigerant circuit (for example, inside the refrigerant line between the service connection "low pressure side" and the A/C compressor).	 Clean the refrigerant circuit (flush with refrigerant R134a). Refer to Refer to ≥ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93 Replace the hose or pipe if kinked or constricted.
	 A/C compressor faulty. 	 Replace the A/C compressor.



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Read the supporting information. Refer to <u>⇒ page 284</u>.

Possible deviation from specification	Possible cause of fault	Corrective action
High pressure increases above specification	◆ A/C compressor activation or functionality malfunctioning.	Check the activation and function of the A/C compressor and service us-
Low pressure quickly drops to specified value,	If one of the valves installed in the refrigerant circuit is faulty or does not work correctly. Refer to	ing the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.
The required cooling output is not attained in the front heater and A/C unit evaporator (and / or in the evaporator for cool-	 ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). 	 Check the function and activation of the various valves installed in the refrigerant circuit via the pressure distribution in the refrigerant circuit.
ing the high-voltage components).	 Constriction or obstruction in re- frigerant circuit. 	Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ven-
	♦ Expansion valve malfunctioning.	tilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
		 Run hand over refrigerant circuit to check for differences in tempera- ture.
		If difference in temperature is found at one component:
	MOI	 Replace the hose or pipe if kinked or constricted.
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E	rvven	Charge the refrigerant circuit.
		Repeat the test.





- With this malfunction, evaporator may ice up although the quantity of refrigerant in circuit is OK.
- If the expansion valve in the heater and A/C unit evaporator or the installed shut-off valve is malfunctioning (permanently closed or does not open sufficiently), the A/C compressor is actuated to maximum output and the low pressure drops to specification or below (compressor draws off refrigerant from low-pressure side). Since no (or little) of the refrigerant can flow via the expansion valve, the cooling output is not attained, high pressure may also not increase or only increase slightly due to the absence of energy. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Checking Cooling Output (vehicle-specific repair manual).
- If the expansion valve for the evaporator for cooling the highvoltage components is faulty (or the function and activation is faulty) is always closed or does not open wide enough the A/C compressor is also activated with the maximum output (the required temperatures in the heat exchanger are not reached). The pressure on the low pressure side only then decreases to the specified value or lower, if no cooling output is needed at the same time in the front heater and A/C unit. The A/C compressor extracts the refrigerant from the low pressure side from both evaporators. Because no refrigerant can flow over the expansion valve in the front heater and A/C unit and the cooling output in the evaporator for cooling the high voltage battery is not reached (there is a malfunction in the area of the evaporator for the cooling of the high voltage battery) the electric A/C compressor is activated with a higher speed. If no refrigerant can flow the pressure on the low pressure side falls under the specified value, high pressure may also not increase or only increase slightly due to the absence of energy. The same applies if a valve in the refrigerant circuit is not OK a malfunction in the incorporation of the evaporator for cooling the high-voltage battery in the high-voltage system refrigerant circuit or the pump or a valve installed there is not OK. Then the high-Voltage Battery Heat Exchanger is cooled, but the cooled coolant reached the high-voltage battery heat exchanger which should not be cooled. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 Coolant Circuit (vehicle-specific repair manual).
- For additional information, refer to ⇒ page 284.



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Po	ossible deviation from speci- fication		Possible cause of fault		Corrective action
•	High and low pressure normal at first after some time,	•	Activation of the A/C compressor is faulty. Use the ⇒ Vehicle diagnostic tester in the "Cuided Fault Finding"	_	Check the activation and function of the A/C com-
•	High pressure increases above specification,		tester in the "Guided Fault Finding" function.		pressor and service using the ⇒ Vehicle diagnostic tester in the "Guided Fault
•	The low pressure decreases to the target value or lower,	•	If one of the valves installed in the refrigerant circuit is faulty or does not work correctly. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep.	_	Finding" function. Check the function and activation of the various valves
•	The required cooling output is not attained in the A/C unit evaporator (and / or in the evaporator for cooling the high-voltage	•	Gr. 87; Refrigerant Circuit (vehicle- specific repair manual). Moisture in refrigerant circuit		installed in the refrigerant circuit via the pressure distribution in the refrigerant circuit. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" func-
	components).				tion and refer to ⇒ Heat-
or •	High and low pressure normal at first,				ing, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-
•	After lengthy driving time, low pressure drops excessively (evaporator in the A/C unit ices up).			_	specific repair manual). Clean the refrigerant circuit (flush with refrigerant R134a). Refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93.
				_	Replace the receiver/dryer with dryer.
				_	Evacuate the refrigerant circuit for at least three hours.
				_	Charge the refrigerant circuit.
		L		_	Repeat the test.



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- First, it is not necessary to clean the refrigerant circuit (flushing with refrigerant R134a, refer to Refer to ⇒ "5.5 Refrig-<u>erant Circuit, Cleaning (Flushing) with Refrigerant R134a</u> page 93) in case of this complaint because generally only a small amount of moisture is in the system and this can be removed by a long evacuation.
- If a problem involving moisture in refrigerant circuit only occurs after a lengthy operating period or only infrequently (low pressure drops below specification and evaporator ices up), it is sufficient to replace the dryer installed in receiver/dryer (adjust quantity of refrigerant oil). Refrigerant circuit is then to be evacuated for at least three hours.
- With this malfunction, levaporator may ice up, although the is not quantity of refrigerant in circuit is OK es not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.
- A malfunction on the Evaporator Vent Temperature Sensor - G263- or / and on the pressure / temperature sensor then can lead to the refrigerant circuit freezing-up. For this concern, also pay attention to the measured values of the different pressure / temperature sensor in the refrigerant circuit. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Checking Cooling Output (vehicle-specific repair manual).
- For additional information, refer to <u>⇒ page 284</u>.

Possible deviation from specification	Possible cause of fault	Corrective action
 High pressure normal Low pressure is too low, The required cooling output is not attained in the A/C unit evaporator (and / or in the evaporator for cooling the high-voltage components). 	 Activation of the A/C compressor is faulty. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function. If one of the valves installed in the refrigerant circuit is faulty or does not work correctly. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). One of the pressure / temperature sensors installed in the refrigerant circuit sends incorrect values. 	 Check the activation and function of the A/C compressor and service using the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function. Check the function and activation of the various valves installed in the refrigerant circuit via the pressure distribution in the refrigerant circuit. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual). Clean the refrigerant circuit (flush with refrigerant R134a). Refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93.

Possible deviation from specification	Possible cause of fault	Corrective action
	 The shut-off valve in front of the expansion valve for the evaporator in the front heater and A/C unit is faulty. The expansion valve for the evaporator in the front heater and A/C unit is faulty. 	 Clean the refrigerant circuit (flush with refrigerant R134a, refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) (not always necessary see the notes).
		 Replace the expansion valve for the evaporator in the front heater and A/C unit as well as the receiver/dry- er.
		 Charge the refrigerant circuit.
		Repeat the test if the function is not OK:
		 Replace the A/C compressor.
		 Charge the refrigerant circuit.
		 Repeat the test.



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- For the malfunction "high pressure normal, low pressure too low", note the following: With this fault, it may be that the evaporator in the A/C unit is icing up although the refrigerant quantity in the circuit is OK.
- If there is a fault in the A/C compressor (the A/C compressor is activated by the A/C Compressor Control Module - J842at too high of a speed), it is not necessary to clean the refrigerant circuit by flushing with refrigerant R134a. Refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93 . In this case, it is sufficient to replace the A/C compressor (observe quantity of refrigerant oil in A/C compressor and if necessary adjust).
- If the expansion valve for the evaporator for cooling the highvoltage components is faulty (or the function and activation is faulty) is always closed or does not open wide enough the A/C compressor is also activated with the maximum output (the required temperatures in the heat exchanger are not reached). The pressure on the low pressure side only then decreases to the specified value or lower, if no cooling output is needed at the same time in the front heater and A/C unit. The A/C compressor extracts the refrigerant from

the low pressure side from both evaporators. Because no by copyright. Copying for private or commercial purposes, in part or in whole, is not refrigerant can flow over the expansion valve in the fronted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability heater and A/C unit and the cooling output in the evaporator to the correctness of information in this document. Copyright by AUDI AG.

for cooling the high voltage battery is not reached (there is a malfunction in the area of the evaporator for the cooling of the high voltage battery) the electric A/C compressor is activated with a higher speed. If no refrigerant can flow the pressure on the low pressure side falls under the specified value, high pressure may also not increase or only increase slightly due to the absence of energy. The same applies if a valve in the refrigerant circuit is not OK a malfunction in the incorporation of the evaporator for cooling the high-voltage battery in the high-voltage system refrigerant circuit or the pump or a valve installed there is not OK. Then the high-Voltage Battery Heat Exchanger is cooled, but the cooled coolant reached the high-voltage battery heat exchanger which should not be cooled. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Coolant Circuit (vehicle-specific repair manual).

- A malfunction on the Evaporator Vent Temperature Sensor - G263- or / and on the pressure / temperature sensor can also cause this issue. Also pay attention to the measured values of the different pressure / temperature sensor in the refrigerant circuit. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Repair Instructions; Cooling Output, Checking (vehicle-specific repair manual).
- For additional information, refer to ⇒ page 284.

Possible deviation from spe fication	ci- Possible cause of fault	Corrective action
 High pressure normal or too high, Low pressure is too high A/C compressor noise (particularly after switchon), The required cooling out put is not attained in the front heater and A/C unit evaporator and / or in the evaporator for cooling th high-voltage component 	 or, Refrigerant Circuit (Verticle-specific repair manual). One of the pressure / temperature sensor installed in the refrigerant circuit. 	 Check the activation and function of the A/C compressor and service using the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function. Check the function and activation of the various valves and pressure/temperature sensors installed in the refrigerant circuit via the pressure distribution in the refrigerant circuit. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
	◆ Too much refrigerant in the circuit.	 Extract refrigerant from the refrigerant circuit. If quantity of refrigerant extracted is substantially greater than specified capacity: Charge the refrigerant circuit.
		 Repeat the test. If quantity of refrigerant extracted roughly corresponds to specified capacity: Check the activation and function of the A/C compressor and the valves installed in the refrigerant circuit (see below).
	 The shut-off valve in front of the expansion valve for the evaporator in the front heater and A/C unit is faulty. The expansion valve for the evaporator in the front heater and A/C unit is faulty. A/C compressor faulty. 	 Check the shut-off valve. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). Replace the expansion valve for the evaporator in the front heater and A/C unit as well as the receiver/dryer.
		Charge the refrigerant circuit.
permitted unless author	opying for private or commercial purposes, in part or in whole, is not ed by AUDI AG. AUDI AG does not guarantee or accept any liability ectress of information in this document. Copyright by AUDI AG.	Repeat the test, is the function is not OK?Replacing the A/C compres-
		sor.



- This fault may also be caused by too much refrigerant oil in the circuit. Overfilling with refrigerant oil can occur if, for example, the compressor has been replaced without adjusting the quantity of refrigerant oil.
- ♦ For additional information, refer to <u>⇒ page 284</u>.

 High and low pressure normal, The required cooling output is not attained in the A/C unit evaporator and in the evaporator for cooling the high-voltage components. High and low pressure normal, A/C compressor noise (particularly after switchon), The required cooling output is not attained in the A/C unit evaporator (and / or in the evaporator for cooling the high-voltage components). 	 Activation of the A/C compressor is faulty. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function. If one of the valves installed in the refrigerant circuit is faulty or does not work correctly. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual). 	 Check the activation and function of the A/C com- pressor and service using the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.
*	One of the pressure / temperature sensor installed in the refrigerant circuit delivers incorrect values.	 Check the function and activation of the various valves and pressure/temperature sensors installed in the refrigerant circuit via the pressure distribution in the refrigerant circuit. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
	 Too much refrigerant in the circuit. The expansion valve for the evaporator in the front heater and A/C unit is faulty. Too much refrigerant oil in the circuit. Protected by copyright. Copermitted unless authorise with respect to the corrections.	ed by AUCI AG. AUDI AG does not guarantee or acc





- Overfilling with refrigerant oil can occur if, for example, the compressor has been replaced without adjusting the quantity of refrigerant oil.
- ♦ If, for example, the expansion valve for the evaporator in the A/C unit or for the evaporator for cooling the high-voltage components is faulty (always open), the evaporator temperature (in the front heater and A/C unit or in the evaporator for cooling the high-voltage components) is no longer regulated so that only refrigerant in gaseous state leaves the evaporator. Under certain usage conditions, liquid droplets may then be drawn in by the compressor and cause noise (liquid cannot be compressed).
- If there is too much refrigerant oil in the circuit, the compressor must be drained and the receiver/dryer must be replaced. After cleaning the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page <u>93</u>), fill the refrigerant circuit with the correct quantity of refrigerant. Refer to Refer to ⇒ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities", page 360.

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♦ For additional information, refer to ⇒ page 284.

Possible deviation from speci-Possible cause of fault Corrective action fication High and low pressure nor- |◆ Activation of the A/C compressor is Check the activation and mal, faulty. Use the ⇒ Vehicle diagnostic function of the A/C compressor and service using tester in the "Guided Fault Finding" The required cooling outfunction. the ⇒ Vehicle diagnostic put is attained in the front tester in the "Guided Fault heater and A/C unit evap-If one of the valves installed in the Finding" function. orator (and on the evaporefrigerant circuit is faulty or does not rator for cooling the highwork correctly. Refer to ⇒ Heating, Check the function and acti-Ventilation and Air Conditioning; Rep. voltage components). vation of the various valves Gr. 87; Refrigerant Circuit (vehicleand pressure/temperature The required cooling outspecific repair manual). sensors installed in the reput is not attained on the frigerant circuit via the pres-One of the pressure / temperature heater core for the heat sure distribution in the resensor installed in the refrigerant cirpump output. frigerant circuit. Use the cuit delivers incorrect values. ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair man-Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability



Possible deviation from speci- fication	Possible cause of fault	Corrective action
	One of the pumps or one of the valves in the coolant circuit for the high-voltage system or the engine is faulty or does not function correctly. Refer to > Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Coolant Circuit (vehicle-specific repair manual).	 Check the function and activation of the components for cooling the high-voltage components. Refer to ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" for the (A/C system, A/C compressor and battery regulation).
permitted unless authorised by AUDI AG.	or commercial purposes, in part or in whole, is not AUDI AG does not guarantee or accept any liability ration in this document. Copyright by AUDI AG.	 Check the incorporation of the heat exchanger in the engine coolant circuit as well as the function and activation of the different pumps and valves. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Coolant Circuit.

- If the required cooling output on the evaporator in the front heater and A/C unit (and on the evaporator for cooling the high-voltage battery is OK) and there is a concern due to insufficient heating performance on the heat exchanger for the heat pump operation. The cause may be in the high-voltage system coolant circuit or in the engine coolant circuit. If the pumps and valves in the high-voltage system coolant circuit is not activated correctly or its function is not OK via the evaporator (heat exchanger) for the high-voltage system components not enough heat energy is absorbed from the coolant. If the pumps and valves in the engine coolant circuit are not activated correctly or are not functioning correctly, the absorbed heat energy, which is transferred via the heat exchanger for heat pump function, may not be delivered to the coolant which flows to the heater core in the heater and A/C unit. Use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function and refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Coolant Circuit (vehiclespecific repair manual).
- For additional information, refer to ⇒ page 284.



9 Refrigerant Circuit Components, Replacing

⇒ "9.1 Components, Replacing", page 299

9.1 Components, Replacing

- ⇒ "9.1.1 Leaking or Damaged Components except A/C Compressor, Reservoir or Receiver/Dryer", page 301
- ⇒ "9.1.2 Leaking or Damaged Components except A/C Compressor, Reservoir or Receiver/Dryer", page 303
- ⇒ "9.1.3 A/C Compressor, Replacing without the Need for Flushing Refrigerant Circuit", page 304
- "9.1.4 A/C Compressor, Replacing due to Leaking or Internal Damage", page 306
- ⇒ "9.1.5 Receiver/Dryer or Reservoir and Restrictor, Replacing thorised by AUDI AG. AUDI AG does not guarantee or accept any liability after Cleaning Refrigerant Circuit", page 308 with respect to the correctness of information in this document. Copyright by AUDI AG.
- ⇒ "9.1.6 Receiver/Dryer or Reservoir, Replacing without the Need for Flushing Refrigerant Circuit", page 309
- ⇒ "9.1.7 Dryer Cartridge and Desiccant Bag, Replacing Without the Need for Flushing Refrigerant Circuit", page 310
- ⇒ "9.1.8 A/C Compressor Regulator Valve N280, Removing, Installing and Replacing", page 310



WARNING

There is a risk of freezing.

Refrigerant may leak out if the refrigerant circuit is not discharged.

Refrigerant must be extracted before opening the refrigerant circuit. If the refrigerant circuit is not opened within 10 minutes of extraction, pressure may form in refrigerant circuit due to evaporation. Extract the refrigerant again.

- All components of the refrigerant circuit submitted for quality observation are always to be sealed (use original sealing caps of replacement part).
- To date, the following replacement parts (A/C compressor, reservoir, receiver/dryer, evaporator and condenser) have been filled with nitrogen gas. This charging stops gradually or the charging pressure is so low that gas does not escape noticeably when opening.
- On vehicles installed with a compressor with no A/C clutch, the engine is only to be started following complete assembly of the refrigerant circuit (A/C compressor always in operation as well) .
- When the refrigerant circuit is empty, the A/C compressor with A/C Compressor Regulator Valve - N280- (without A/C clutch) is switched to internal lubrication with the result that only a minimal amount of oil is pumped from the A/C compressor into the circuit.





- As parts are sometimes stored for lengthy periods and at different locations within the spare parts organization, it is entirely possible that gas will escape from some parts and not from others on initial opening (even in the case of identical spare part numbers). Sealing caps at replacement part connections are therefore to be removed carefully and the nitrogen gas allowed to escape slowly.
- The refrigerant circuit is equipped either with a restrictor and a reservoir, or with an expansion valve and receiver/dryer.
- The dryer cartridge or components with desiccant bag (reservoir, receiver/dryer) are always to be replaced after cleaning the refrigerant circuit by flushing with refrigerant R134a (refer to Refer to ⇒ <u>"5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93</u>), or blowing through using compressed air and nitrogen (refer to Refer to = 5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89) in doing so, leave sealed as long as possible to minimize absorption of moisture.
- Replace the dryer cartridge or the components with a desiccant bag (reservoir, receiver/dryer) if it is required for certain repair procedures or if the refrigerant circuit has been open for a longer period of time and moisture has gotten in (after an accident, for example). Refer to Refer to ⇒ "9.1.1 Leaking or Damaged Components except A/C Compressor, Reservoir or Receiver/Dryer", page 301 .
- The period of time which a refrigerant circuit may be left open without having to replace a component with the desiccant bag (reservoir, receiver/dryer) depends on ambient influences to a large extent. Given a high ambient temperature and a high humidity level or if the vehicle, for exam-ple, has been standing in the open or driven (in wet, foggy weather conditions), the period will be considerably shorter than for a vehicle which has been standing in a heated drys not area. The size of the opening through which moisture may ingress into the circuit also influences the period for which a refrigerant circuit can be left open without having to replace the component with the desiccant bag. Refer to Refer to ⇒ <u>"9.1.1 Leaking or Damaged Components except A/C Com-</u> <u>pressor, Reservoir or Receiver/Dryer", page 301</u> .
- Seal open connections and pipes (to prevent absorption of moisture).
- Always replace the restrictor.



Caution

Dispose of dirty or used oils of unknown origin paying attention to local regulations. Refer to ⇒ Audi ServiceNet, **HSO Environment.**



9.1.1 Leaking or Damaged Components except A/C Compressor, Reservoir or Receiver/Dryer

The refrigerant circuit was completely empty (for example with larger leak or cracked hose line)



Note

- In the event of only a minor leak with slow escape of refrigerant (for example at a small leakage point), the amount of refrigerant oil lost and the amount of moisture penetrating is not sufficient to influence the A/C system function.
- The operations marked * are only to be implemented in case of a major leak (for example after a collision).

Electrically-Driven A/C Compressor

- Remove the faulty component. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Remove the electrically-driven A/C compressor and flush. Refer to Refer to ⇒ "5.5.2 Electrically-Driven A/C Compressor, Flushing (Removing Refrigerant Oil)", page 113
- Clean the refrigerant circuit (flush with Refrigerant R134a). Refer to Refer to \$\(\pi\) "5.5 Refrigerant Circuit, Cleaning of Pasa or commercial purposes, in part or in whole, is not Refer to Refer to \$\(\pi\) "5.5 Refrigerant Circuit, Cleaning of Pasa or commercial purposes, in part or in whole, is not Refer to Refer to \$\(\pi\) "5.5 Refrigerant Circuit, Cleaning of Pasa or commercial purposes, in part or in whole, is not Refer to Refer to \$\(\pi\) "5.5 Refrigerant Circuit, Cleaning of Pasa or commercial purposes, in part or in whole, is not Refer to \$\(\pi\) "5.5 Refrigerant Circuit, Cleaning of Pasa or commercial purposes, in part or in whole, is not Refer to \$\(\pi\) "5.5 Refrigerant Circuit, Cleaning of Pasa or commercial purposes, in part or in whole, is not Refer to \$\(\pi\) "5.5 Refrigerant Circuit, Cleaning of Pasa or commercial purposes, in part or in whole, is not Refer to \$\(\pi\) "5.5 Refrigerant Circuit, Cleaning of Pasa or commercial purposes, in part or in whole, is not Refer to \$\(\pi\) "5.5 Refrigerant Circuit, Cleaning of Pasa or commercial purposes, in part or in whole, is not Refer to \$\(\pi\) "5.5 Refrigerant Circuit, Cleaning of Pasa or commercial purposes, in part or in whole, is not Refrigerant Circuit, Cleaning of Pasa or commercial purposes, in part or in whole, is not Refrigerant Circuit, Cleaning of Pasa or commercial purposes, in part or in whole, is not Refrigerant Circuit, Cleaning of Pasa or commercial purposes, in part or in whole, is not refrict to the correct commercial purposes, in part or in whole, is not refrict to the correct commercial purposes, in part or in whole, is not refrict to the correct commercial purposes, in part or in whole, is not refrict to the correct commercial purposes, in part or in whole pasa or commercial purposes, in part or in whole pasa or commercial purposes, in part or in whole pasa or commercial purposes, in part or
- Fill the A/C compressor or the refrigerant circuit completely with refrigerant oil to the specified capacity.

Mechanically Driven A/C Compressor

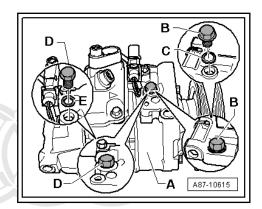
- Remove the faulty component. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Remove the A/C compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual)*.

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Remove the oil drain plug -B- / -D- from the A/C compressor



- There are different versions of the oil drain plug -B- / -Dand seal -C- / -E- (depending on the A/C compressor manufacturer).
- When installing the oil drain plug -B- / -D-, pay attention to the tightening specification (dependent on the A/C compressor manufacturer and the oil drain plug version). For example, a seal is installed on the oil drain plug on a "Denso" and "Delphi" A/C compressor (tightening specification currently 30 Nm on a "Denso" A/C compressor and 15 Nm on a "Delphi" A/C compressor). On "Sanden" or "Zexel- / Valeo" A/C compressors an oil drain plug or a seal is installed depending on the version on the oil drain plug (tightening specification currently 10 Nm).



- A/C compressors made by "Denso" or "Nippondenso" and "Delphi" have an oil drain plug -D-, for example with a seap private or commercial purposes, in part or in whole, is not Einstalled on it Panlace according willing unless pulpings by AUDI AG. AUDI AG does not guarantee or accept any liability -E- installed on it. Replace according to the specific full of the speci Parts Catalog (ETKÁ) .
- Depending on the version, an O-ring or a seal -C- is installed on the oil drain plug -B- on a "Sanden" or "Zexel/ Valeo" A/C compressor. To replace, refer to the ⇒ Electronic Parts Catalog (ETKA) .
- If the seals (seal or O-ring) that are installed on the oil drain plug are not available as a replacement part, the removed seals may be used as an exception (check for damage before installing). If the removed seal is damaged or deformed if necessary replace with a commercially available compo-
- To accelerate drainage of refrigerant oil, rotate the A/C compressor by way of clutch plate of A/C clutch, for example.
- After charging the refrigerant circuit check the installed oil drain plug for leaks for example using an electronic leak detector.
- Drain the old refrigerant oil from the A/C compressor* (Disposing. Refer to ⇒ Audi-ServiceNet, HSO Environment).



All



Note

- Then fill A/C compressor with quantity of fresh refrigerant oil corresponding to quantity of refrigerant oil in replacement A/C compressor. Refer to Refer to ⇒ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities", page 360 .*
- Use different refrigerant oils and quantities for the various A/C compressors. Refer to Refer to ⇒ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities", page 360
- To ensure compressor lubrication on start-up, at least 40 cm³ of refrigerant oil must be poured into the compressor. The remainder can be added to the new reservoir or receiver/dryer. Refer to Refer to ⇒ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities", page 360.
- If dirt has penetrated into the compressor with the refrigerant circuit open (for example after an accident), compressor is to be replaced.
- Clean refrigerant circuit (flush with refrigerant R134a (Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrige private or commercial purposes, in part or in whole, is not erant R134a", page 93.) or blow through with compressed AUDI AG. AUDI AG does not guarantee or accept any liability air and nitrogen (Refer to Refer to ⇒ "5.4 Refrigerant Circuit, of information in this document. Copyright by AUDI AG. Cleaning with Compressed Air and Nitrogen", page 89.)*
- Replace the dryer cartridge*, receiver/dryer* or reservoir* and restrictor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Assemble, evacuate and recharge the refrigerant circuit.

9.1.2 Leaking or Damaged Components except A/C Compressor, Reservoir or Receiver/Dryer

Refrigerant circuit still contains refrigerant (for example, with minor leak)

- Discharge the refrigerant circuit.
- Remove the malfunctioning component, flush with compressed air, collect escaping refrigerant oil.
- The new component is to be filled with the amount of refrigerant oil flushed out (positive 20 cm³ for evaporator, positive 10 cm³ for condenser, refrigerant pipes and refrigerant hoses) as fresh refrigerant oil fill.



Note

Dispose of old refrigerant oil (pay attention to local regulations). Refer to ⇒ VW / Audi ServiceNet.

- If equipped, replace the restrictor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Assemble, evacuate and charge the refrigerant circuit.



9.1.3 A/C Compressor, Replacing without the Need for Flushing Refrigerant Circuit



Note

- Cleaning the refrigerant circuit means flushing with refrigerant R134a. Refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93.
- If a faulty A/C compressor is replaced with an A/C compressor from another manufacturer, check if the same refrigerant oil is approved for the A/C compressor to be installed as the one that is already in the refrigerant circuit (from the removed: A/Cicompressor) of a different refrigerant oil is ape, is not proved for the A/C compressor to be installed than the oney liability in the removed A/C compressor, the refrigerant circuit must be flushed. Refer to Refer to <u>> "10.2.1 Approved Refrigerant"</u> Oils", page 362.

For example, in the event of external damage following an accident (or for an electrical fault).

- Discharge the refrigerant circuit.
- Remove the A/C compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual).



Note

Use different refrigerant oils and quantities for the various compressors. Refer to Refer to ⇒ "10.2.2 Refrigerant Oil Capacities", page 364

Electrically-Driven A/C Compressor

When an electrically driven A/C compressor is replaced, determine the amount of refrigerant oil found in the removed A/C compressor by flushing. Refer to Refer to ⇒ "5.5.2 Electrically-Driven A/C Compressor, Flushing (Removing Refrigerant Oil)", page 113 . Pour the refrigerant oil out of the A/C compressor to be installed so that only the amount or refrigerant oil remains in the A/C compressor as the amount flushed out of the removed A/C compressor. Refer to Refer to ⇒ "10.2.2 Refrigerant Oil Capacities", page 364.

Example:

- From the A/C compressor to be replaced 120cm³ is flushed. Refer to Refer to ⇒ "5.5.2 Electrically-Driven A/C Compressor, Flushing (Removing Refrigerant Oil)", page 113.
- In the A/C compressor to be installed there are 200cm³ refrigerant oil (Refer to the data plate and refer to ⇒ <u>'10.2.2 Refrigerant Oil Capacities", page 364</u>).
- Tip out from the new A/C compressor (next over the connection for the refrigerant pipe low pressure side) enough refrigerant that only the amount of refrigerant oil (plus 10cm³) remains in it, as before the replaced A/C compressor was flushed out. An example is 110cm³ refrigerant oil (this will insure that the refrigerant oil quantity in the refrigerant circuit after installing is correct).





- Electrically driven A/C compressors cannot have the refrigerant oil poured out in the same manner as a mechanically driven A/C compressor. There is no drain plug, the A/C compression cannot be turned and because it is installed inside defending on the version only a specialized part or no refrigerant oil can be poured out. (Due to the different distribution of refrigerant oil in the A/C compressor). Usually a residual amount between 30 and 80 cm³ remains in the A/C compressor when pouring out. For this reason, the removed A/C compressor is to be flushed to remove the refrigerant part or in whole, is not oil and to determine the amount of refrigerant oils depending accept any liability on the complying person is a second of the se on the complaint. Refer to Refer to ⇒ *"5.5.2 Electrically-Driv*en A/C Compressor, Flushing (Removing Refrigerant Oil)", *page 113* .
- If the recommended amount of refrigerant oil cannot be poured out of the A/C compressor to be installed if necessary the new A/C compressor to be installed may be flushed. In the new A/C compressor as much refrigerant oil the amount is to be filled as was flushed out of the old A/C compressor. Refer to Refer to ⇒ "5.5.2 Electrically-Driven A/C Compressor, Flushing (Removing Refrigerant Oil)", *page 113* .
- At room temperature the refrigerant oil had approximately the same density as water (1 kg (2.2 lbs) equals a liter).
- ♦ Also electrical A/C compressors of the same version (same manufacturer, same part number) mostly do not have the same weight so that the amount of refrigerant oil contained cannot be determined by weighing (the tolerances are too large, to determine the amount of refrigerant oil contained via the weight).
- Depending on the construction and the storage of the A/C compressor the refrigerant oil separated unevenly in the A/C compressor. One part can be located in the compression chamber and another in the area of the electronic motor, so that here the refrigerant oil must be alternately poured out via both connections for the refrigerant lines (high and low pressure side). While doing this arrange the A/C compressor so that the relevant connection is as far downward as possible.
- Dispose of the refrigerant oil removed from the defective and the new A/C compressor and poured out refrigerant oil from the new A/C compressor which is no longer necessary. Refer to ⇒ Audi ServiceNet, HSO Environment (pay attention to local regulations).

Mechanically Driven A/C Compressor

Remove the oil drain plug from the A/C compressor (mechanically driven A/C compressor).



Note

There are different versions of the oil drain plug and its seal (it can be either an O-ring or a gasket; always replace). Refer to Refer to <u>⇒ "9.1.1 Leaking or Damaged Components except A/C</u> Compressor, Reservoir or Receiver/Dryer", page 301 and to the ⇒ Electronic Parts Catalog (ETKA) .

To accelerate drainage of refrigerant oil, rotate the A/C compressor by way of clutch plate of A/C clutch, for example.

- Drain the old refrigerant oil from the A/C compressor and
- Remove the oil drain plug from replacement A/C compressor, pour out refrigerant oil in a clean container and only add a quantity of fresh refrigerant oil equal to the amount poured out of the malfunctioning A/C compressor.

dispose. Refer to ⇒ Audi-ServiceNet, HSO Environment



Caution

(pay attention to local regulations).

There is a risk of damaging the A/C compressor with dirty refrigerant oil.

- Refrigerant oil that is poured out from the new A/C compressor can only be reused when it is located in a clean container and the necessary amount after pour out is refilled in the A/C compressor.
- Do not reuse refrigerant oil when it is dirty or there is moisture, this is to be disposed of.



Note

- If, for example, 70 cm³ of refrigerant oil has been poured out of the defective A/C compressor and 220 cm³ out of the replacement A/C compressor (a small quantity of refrigerant oil remains in the A/C compressor). In this case fill the A/C compressor that is to be installed with 70cm³ refrigerant oil. The refrigerant oil that was poured out of the new (replacement) A/C compressor can be reused, if there is no dirt of moisture in it.
- Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not Use different refrigerant oils and quantities for the literations authorised by AUDI AG. AUDI AG does not guarantee or accept any liability compressors. Refer to Refer to ⇒ "10 Refrigerant R134a" Capacities, Refrigerant Oil and Approved Refrigerant Oils", page 318 .
- If a greater quantity of refrigerant oil (more than approximately 40 cm³) has been poured out of the malfunctioning compressor, the remaining refrigerant oil can also be added to the evaporator or receiver/dryer. Refer to Refer to *⇒ "10 Refrigerant R134a Capacities, Refrigerant Oil and Ap*proved Refrigerant Oils", page 318.

All

- Replace the restrictor (only if there is one in this refrigerant circuit).
- Assemble, evacuate and charge the refrigerant circuit.

9.1.4 A/C Compressor, Replacing due to Leaking or Internal Damage

For example, because of noise or no A/C compressor output



- If there is damage on the A/C compressor electronics, for example on the A/C Compressor Regulator Valve - N280on a mechanical A/C compressor or on the A/C Compressor Control Module - J842- of the electrical A/C compressor, then the refrigerant circuit does not have to always be cleaned. Here it is usually acceptable to replace the A/C compressor without cleaning the refrigerant circuit (adapt the amount of refrigerant oil). Refer to Refer to ⇒ "9.1.3 A/C Compressor, Replacing without the Need for Flushing Refrigerant Circuit", page 304
- If a faulty A/C compressor is replaced with an A/C compressor from another manufacturer, check if the same refrigerant oil is approved for the A/C compressor to be installed as the one that is already in the refrigerant circuit (from the removed A/C compressor). If a different refrigerant oil is approved for the A/C compressor to be installed than the one in the removed A/C compressor, the refrigerant circuit must be flushed. Refer to Refer to ⇒ "10.2.1 Approved Refrigerant Oils", page 362.
- Discharge the refrigerant circuit.
- Remove the A/C compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual).
- Clean the refrigerant circuit (flush with refrigerant R134a). Refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93.



Note

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- If there is internal damage (to the A/C compressor), check the refrigerant hoses and condenser. If small fragments have gotten in, for example, clean the refrigerant hoses and gas cooler (condenser) (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93 to flush with refrigerant R134a) and replace the refrigerant hoses if necessary.
- In vehicles with two evaporators, the refrigerant oil quantity in refrigerant circuit may be greater than the quantity which is found in the replacement compressor, if necessary add the remaining refrigerant oil quantity to the refrigerant circuit. Refer to Refer to <u>⇒ "5.4 Refrigerant Circuit, Cleaning with</u> Compressed Air and Nitrogen", page 89.
- Replace the dryer cartridge, receiver/dryer or reservoir and restrictor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Check the expansion valve for dirt or corrosion; replace if necessary. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Assemble, evacuate and charge the refrigerant circuit.

9.1.5 Receiver/Dryer or Reservoir and Restrictor, Replacing after Cleaning Refrigerant Circuit



Note

Cleaning the refrigerant circuit means flushing it with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blowing through with compressed air and nitrogen (refer to Refer to *⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and* Nitrogen", page 89).

For example, on account of ingress of moisture (refrigerant circuit open for lengthy period) or contamination

- Discharge the refrigerant circuit.
- Remove the A/C compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual).
- Rectify the cause of the malfunction.
- Clean the refrigerant circuit (flush with refrigerant R134a). Refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93.
- Examine the expansion valve for dirt or corrosion; replace if necessary ted by copyright. Copying for private or commercial purposes, in part or in whole, is not AG. AUDI AG does not guarantee or accept any liability

Electrically-Driven A/C Compressor ormation in this document. Copyright by AUDI AG.

Flush the old refrigerant oil out of A/C compressor. Refer to ⇒ "5.5.2 Electrically-Driven A/C Compressor, Flushing (Removing Refrigerant Oil)", page 113.

Mechanically Driven A/C Compressor

Remove the oil drain plug from the A/C compressor.



Note

There are different versions of the oil drain plug and its seal (it can be either an O-ring or a gasket; replace). Refer to Refer to ⇒ "9.1.1 Leaking or Damaged Components except A/C Compressor, Reservoir or Receiver/Dryer", page 301 and to the ⇒ Electronic Parts Catalog (ETKA).

- To accelerate drainage of refrigerant oil, rotate the A/C compressor by way of clutch plate of A/C clutch, for example.
- Pour old refrigerant oil out of A/C compressor.



Note

Dispose of the old refrigerant oil. Refer to ⇒ Audi ServiceNet, HSO Environment (pay attention to local regulations).

All A/C Compressors

Then add to the A/C compressor the new refrigerant oil quantity which matches the refrigerant oil quantity in the replacement compressor (or the specified refrigerant oil quantity in vehicles with two evaporators if necessary). Refer to



Refer to ⇒ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities", page 360.



Note

- Use different refrigerant oils and quantities for the various compressors. Refer to Refer to ⇒ "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities", page 360
- To ensure compressor lubrication on start-up, at least 40 cm³ of refrigerant oil must be poured into the compressor. The remainder can be added to the new reservoir or receiver/dryer. Refer to Refer to ⇒ "10 Refrigerant R134a Capaci-<u>ties, Refrigerant Oil and Approved Refrigerant Oils", page</u>
- If dirt has penetrated into the A/C compressor with the refrigerant circuit open (for example after an accident), A/C compressor is to be replaced.
- In vehicles with two evaporators, the refrigerant oil quantity in refrigerant circuit may be greater than the quantity which is found in the replacement compressor, if necessary add the remaining refrigerant oil quantity to the refrigerant circuit. Refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89.

All Vehicles

- Replace the receiver/dryer or reservoir and restrictor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Assemble, evacuate and charge the refrigerant circuit.
- 9.1.6 Receiver/Dryer or Reservoir, Replacing without the Need for Flushing Refrigerant Circuit



Note

Cleaning the refrigerant circuit means flushing it with refriger-Prot*ant R134a (referito Refer to mit 5.5 Refrigerant Circuit, Clean*perning (Flushing) with Refrigerant R134a", page 93 por blowing wthrough with compressed air and nitrogen (refer to Refer to "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89).

For example, in the event of accident damage; no escape of refrigerant and no ingress of moisture and dirt into circuit.

- Discharge the refrigerant circuit.
- Replace the restrictor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual).
- Remove the receiver/dryer or reservoir. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Remove dirt from the receiver/dryer or reservoir.
- Weigh removed receiver/dryer or reservoir.
- Add refrigerant oil to the reservoir until it is the same weight as the receiver/dryer that was removed.

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- Install new receiver/dryer or reservoir.
- Assemble, evacuate and charge the refrigerant circuit.
- 9.1.7 Dryer Cartridge and Desiccant Bag, Replacing Without the Need for Flushing Refrigerant Circuit

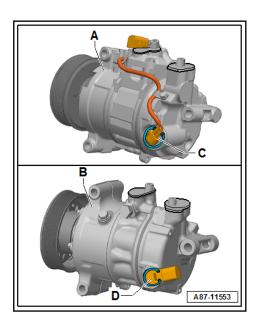


Note

Cleaning the refrigerant circuit means flushing it with refrigerant R134a (refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93) or blowing through with compressed air and nitrogen (refer to Refer to ed by copyright. Copying for private or commercial purposes, in part or in whole, is not ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Airrand unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability Nitrogen" page 89.)
Nitrogen" page 89.) Nitrogen", page 89).

For example, no escape of refrigerant and no ingress of moisture and dirt into the circuit.

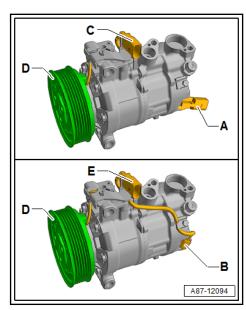
- Discharge the refrigerant circuit.
- Replace the dryer cartridge. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Assemble, evacuate and charge the refrigerant circuit.
- 9.1.8 A/C Compressor Regulator Valve -N280-, Removing, Installing and Replacing







- Certain malfunctions at the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- (for example, a stuck valve or a short circuit in the coil) can lead to a complaint regarding the A/C compressor (A/C system is not cooling, the evaporator ices over, etc.). If the cause is with the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- (and not the A/C compressor itself), the A/C compressor can be serviced by replacing the A/C Compressor Regulator Valve A/C Compressor Regulator Valve -N280- -C and D-.
- The A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -C and D- is not available as a replace-ment part for all A/C compressors. If the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280-is not available as an individual A/C compressor part, then the entire A/C compressor must be replaced. Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- The A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- is available in different versions and settings. Refer to the ⇒ Electronic Parts Catalog (ETKA). On the A/C compressor -A- (shown is an A/C compressor manufactured by "Denso" without an A/C Clutch - N25-), the connector for the vehicle wiring harness connection is attached with a short wiring harness to the A/C Compressor Regulator Valve A/C Compressor Regulator Valve -N280- -C-. On the A/C compressor -B- (shown is an A/C compressor manufactured by "Sanden"), the connector for the vehicle wiring harness connection is mounted directly on the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -C-. The removal and installation of the A/C Compressor Regulator Valve A/C Compressor Registration of the A/C Compressors Registration Valve - N280--C and D- on other A/C compressors (other type and manufacturer) is basically the same and only slightly deviates from the procedure described below.
- The A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- is available in different versions and settings. Refer to the ⇒ Electronic Parts Catalog (ETKA) . On an A/C compressor with an A/C Clutch A/C Clutch - N25-(shown is an A/C compressor manufactured by "Denso"), the connector for the vehicle wiring harness connection is mounted directly on the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -A-. On another A/C compressor, the connector for the vehicle wiring harness connection is combined in a 3-pin connector -E- for the A/C Clutch A/C Clutch - N25- and the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- .
- For version -B- of the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280-, the wire connection may be directly connected to the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280-, or there is an additional connector on the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- .
- Removing and installing the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -A and B- is essentially the same on both versions. It only deviates slightly from the procedure described below. On an A/C compressor with a 3-pin connector -E-, disconnect the respective wires for the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- from the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- , remove from the connector -E- or cut at a suitable location





(and reattach using wire connectors from the Wiring Harness Repair Set - VAS 1978 B-).

If the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- malfunction was found to be caused by dirt, shavings or abraded A/C compressor material after the removal of the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- , clean the refrigerant circuit and replace the A/C compressor. Refer to Refer to ⇒ "9.1.4 A/C Compressor, Replacing due to Leaking or Internal Damage", page 306 and Refer to ⇒ "5.5 Refrigerant" Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93 .

Removing

Discharge the refrigerant circuit. Refer to <u>⇒ "5.3 A/C Service</u> Station, Using", page 73 .



Caution

There is a risk of damaging the A/C compressor if the refrigerant circuit is empty.

Do not start the engine if the refrigerant circuit is empty.

- Depending on the version of the A/C service station, the refrigerant circuit pressure may be less than 1 bar (14.5 psi) absolute pressure after it has been discharged.
- Depending on the version of the A/C compressor, it may be damaged if it is operated when there is low refrigerant circuit pressure.
- Do not start the engine while the refrigerant circuit pressure is less than the ambient pressure.
- Depending on the vehicle and component location of the A/C compressor, remove the components. hat prevent accesse or accept any liability to the A/C Compressor Regulator Valve A/C Compressor Begulator Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

For vehicles where at least one of the two refrigerant lines and the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- cannot be disconnected and removed while the A/C compressor is attached to the engine.

Remove the A/C compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; A/C Compressor (vehicle-specific repair manual).



Note

A refrigerant line must be removed on an installed A/C compressor so that it is assured, that the pressure in the A/C compressor is the same as the ambient pressure.

For a vehicle where at least one of the two refrigerant lines and the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- can be disconnected and removed while the

A/C compressor is attached to the engine (the A/C compressor is not removed).



WARNING

There is a risk of freezing.

- ◆ Before removing the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- , connect the A/C service station and extract the refrigerant. Refrigerant circuit must be empty to avoid possible injury.
- Refrigerant and refrigerant oil will leak out if the refrigerant circuit is not discharged.
- The refrigerant is extracted before removing the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280 - If the A/C Compressor Regulator guarant Valve A/C Compressor Regulator Valve - N280 - is not ... Co removed within 10 minutes after extraction, pressure may build up in the refrigerant circuit by renewed evaporation. Extract the refrigerant again.

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- Check the pressure in the refrigerant circuit once more via the A/C service station pressure gauge.
- If the displayed pressure is larger than the ambient pressure (larger than approximately 1 bar (14.5 psi) absolute pressure), turn on the A/C service station and extract the refrigerant that is building up the pressure.
- Disconnect one of the two refrigerant lines from the A/C compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



Note

A refrigerant line must be removed on an installed A/C compressor so that it is assured, that the pressure in the A/C compressor is the same as the ambient pressure.

All Vehicles

Before removing the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- check again if the A/C compressor is actually being driven by the belt pulley/drive unit. If the belt pulley or the drive unit overload protection has triggered, the cause for the fault is not the regulator valve but rather the A/C compressor (for example does not move easily).



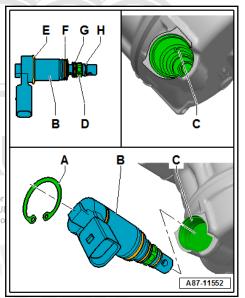
◆ This illustration shows the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -B- on a A/C compressor manufactured by "Sanden" type "PXE 14". The connector for the vehicle wiring harness connection on these A/C compressors is mounted directly on the A/C Compressor Regulator Valve - N280- -B-. The removal and installation of the A/C Compressor Regulator Valve - N280- -B- on other A/C compressors (other type and manufacturer, for example "Denso", the A/C Compressor Regulator Valve A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- with a copying to short wiring harness to the connector) can differed the proceed by Aldure for removal and installation is however the same, ascorrectness described in the following for the A/C compressor manufactured by "Sanden" type "PXE 14".



- ◆ For an A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -B- without an O-ring -E-, dirt can penetrate into the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -C- mount up to the O-ring -F-.
- If equipped, loosen the wire connection from the A/C Compressor Regulator Valve A/C Compressor Regulator Valve
 N280- -B- for the connector to the vehicle wiring harness from the A/C compressor.



- ♦ On an A/C compressor with an A/C Clutch N25- where the A/C Clutch A/C Clutch N25- is activated via the same connector as the A/C Compressor Regulator Valve A/C Compressor Regulator Valve N280- -B-, remove the applicable wires from the connector (for example, using an extractor from the Wiring Harness Repair Set VAS 1978B-). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- If a connector should be installed on an A/C compressor with an A/C Clutch - N25- where the wires cannot be removed, cut the wires to the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- (or to the A/C Clutch A/C Clutch - N25-) at a suitable location and reattach using wire connectors from the Wiring Harness Repair Set -VAS 1978 B- (or replace the connector itself. Refer to the ⇒ Electronic Parts Catalog (ETKA)). Refer to ⇒ Electrical Equipment; Rep. Gr. 97; Connectors; Wiring Harnesses and Connectors, Repairing.



Clean the A/C compressor near the circlip -A- and the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -B- thoroughly.

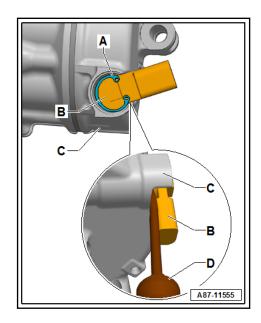


permi

Caution

The pressure in the A/C compressor must be equal to the ambient pressure.

- ♦ Refrigerant and refrigerant oil can leak out if there is excess pressure in the A/C compressor.
- Dirt can be absorbed into the A/C compressor if there is a vacuum in the A/C compressor.
- Make sure there is pressure equalization before removby ∞ing the A/C Compressor Regulator Valve A/C Compres-Sor Regulator Valve N280 no Buarantee or accept any liat to the correctness of information in this document. Copyright by AUDI AG.
- Remove the circlip -A-.
- Carefully remove the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -B- from the A/C compressor mount -C-, using a suitable screwdriver -D-, for example.



Check the removed A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -B- and A/C compressor mount -C- for dirt.

Note

- If the screen -D- on the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -B- to the O-ring -F- or the A/C compressor mount -C- in this area are heavily contaminated (for example with shavings or dark, sticky abraded material), this indicates damage on the A/C compressor. In this case, the refrigerant circuit is to be cleaned and the A/C compressor is to be replaced. Refer to Refer to ⇒ "9.1.4 A/C Compressor, Replacing due to Leaking or Internal Damage", page 306 and Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page
- If the strainer -D- on the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -B- and the A/C compressor mount -C- up to the O-ring sealing surface -Fare only lightly contaminated (with gray deposits from normal A/C compressor operation, for example), a malfunction at the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -B- can cause the A/C compressor malfunctioning.
- For an A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -B- without an O-ring -E-, dirt can penetrate into the mount -C- up to the O-ring seal -E- during operation. Remove the dirt carefully and completely using, for example, a lint-free cloth (do not work with compressed air).

В D

Installing

Check the A/C compressor mount -C- and the circlip groove for dirt, and if necessary, clean them carefully and thoroughly with a clean, lint-free cloth.



Caution

Danger of another A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -B- or A/C compressor failure due to dri in the A/C compressor or damage to the sealing surfaces in the mount.

- If necessary, carefully clean the A/C compressor mount -C- using only a clean, lint-free cloth (do not use compressed air).
- Make sure while cleaning the mount -C- that no dirt gets into the area underneath the O-ring sealing surface -For the existing channels and none of the mount sealing surfaces become damaged.

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- Check the A/C compressor mount -C- for damage (also pay attention to small scratches on the surface, if there is damage, replace the A/C compressor).
- Check the O-rings -F, G, H- and -E- (if equipped) of the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -B- for damage.
- Coat the O-rings -F, G, H- and -E- (if applicable) of the A/C Compressor Regulator Valve A/C Compressor Regula-

tor Valve - N280- -B- lightly with refrigerant oil and check for proper seating.

- Insert the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -B- all the way into the A/C compressor mount -C-.
- Install the new circlip -A- and check for proper seating in the groove.
- Re-install all removed parts in the reverse order.
- Evacuate and refill the refrigerant circuit. Refer to ⇒ "5.3 A/C" Service Station, Using", page 73



Note

Should the refrigerant oil escape with the A/C Compressor Regulator Valve A/C Compressor Regulator Valve - N280- -Bremoved, add this amount of refrigerant oil while filling the refrigerant oil with the A/C service station. Refer to Refer to ≥ <u>"5.3 A/C Service Station, Using", page 73</u>.

Check the A/C system function. Refer to ⇒ "8 Pressures, Checking", page 208 and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



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Αυδι

10 Refrigerant R134a Capacities, Refrigerant Oil and Approved Refrigerant Oils

- ⇒ "10.1 Refrigerant R134a Capacities", page 318
- "10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities", page 360

10.1 Refrigerant R134a Capacities

- ⇒ "10.1.1 Capacities for Audi A1 (8X_) from MY 2011", page
- "10.1.2 Capacities for Audi A2 (8Z_) from MY 2001", page <u>321</u>
- ⇒ "10.1.3 Capacities for Audi A3 (8L_) from MY 1997 and Audi TT (8N_) from MY 1999", page 321
- ⇒ "10.1.4 Capacities for Audi A3 (8P_) from MY 2004 and Audi Q3 (8U_ or 84_ for China) from MY 2012", page 324
- ⇒ "10.1.5 Capacities for Audi Q2 (GA_) from MY 2017, Audi A3 (8V_ or 85_ for China) from MY 2013, Audi A3 e-tron (8V_) from MY 2015, and Audi RS 3 (8V_) from MY 2016", page 325
- "10.1.6 Capacities for Audi TT (8J_) from MY 2007", page
- ⇒ "10.1.7 Capacities for Audi TT (FV_) from MY 2015", page <u>327</u>
- ⇒ "10.1.8 Capacities for Audi 80 (8A_/8C_), Audi Coupe (8B_) and Audi Cabriolet (8G_) through MY 2002", page 328
- "10.1.9 Capacities for Audi A4 (8D_) from MY 1995", page 328
- ⇒ "10.1.10 Capacities for A4 (8E_) from MY 2001 and Audi A4 Cabriolet (8H_) from MY 2003", page 331
- ⇒ "10.1.11 Capacities for Audi A4 (8K_) from MY 2008, Audi A5 Coupe and Sportback (8T_) from MY 2008, Audi Q5 (8R_o 83_for China) from MY 2008, Audi A5 Cabriolet (8F_) from MY 2008, Audi A5 Cabriolet (8F_) from MY 2009, and Audi Q5, Hybrid (8R.,) from MY 2011, page 332 art or in whole, is not
- ⇒ "10.1.12 Capacities for Audi A4 (8Wm) from MY 2016 Audi to your Audi AG. A4 (86_ for China) from MY 2017, Audi A5 (F5_) from MY 2016, Audi Q5 (FY_) from MY 2017, Audi Q5 (87_ China) from MY
- ⇒ "10.1.13 Capacities for Audi 100 / Audi A6 (4A_) through MY 1998", page 344
- ⇒ "10.1.14 Capacities for Audi A6 (4B_) from MY 1998 and Audi Allroad (4B_) through MY 2005", page 345
- ⇒ "10.1.15 Capacities for Audi A6 (4F_) from MY 2005", page 351
- ⇒ "10.1.16 Capacities for Audi A6 (4G_ or 4X_ for China) from MY 2011, Audi A7 (4G_ or 4X_ for China) from MY 2011, Audi

A6 Hybrid (4G_) from MY 2012 and A6 e-tron (4G_) from MY <u>2017", page 352</u>

- ⇒ "10.1.17 Capacities for Audi V8 (4C_) through MY 1994", <u>page 354</u>
- "10.1.18 Capacities for Audi A8 (4D_) from MY 1994", page
- ⇒ "10.1.19 Capacities for Audi A8 (4E_) from MY 2003", page 355
- ⇒ "10.1.20 Capacities for Audi A8 (4H_) from MY 2010 and Audi A8 Hybrid (4H_) from MY 2012", page 356
- ⇒ "10.1.21 Capacities for Audi Q7 (4L_) MY 2006", page 357
- ⇒ "10.1.22 Capacities for Audi Q7 (4M_) from MY 2016", page 358
- ⇒ "10.1.23 Capacities, Audi R8 (42_) from MY 2008, Audi R8 (4S_) from MY 2015", page 358
- From Audi A8 (4N) from MY 2018 the capacity for Refrigerant R134a can be found in the vehicle-specific repair manual. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Technical Data.



Note

- When charging the high-pressure side of refrigerant circuits, always use maximum amount of refrigerant (some of the refrigerant remains in the charging hoses).
- The specified capacities for refrigerant R134a apply if no other different specifications given for the "S" and "RS".
- Make sure that the A/C Service Station is standing at the same level as the vehicle (maximum difference: 50 cm) when charging the refrigerant circuit. If the difference in height is large enough, the displayed and the actual amount of refrigerant added to the circuit may differ, depending on the version of the A/C Service Station The filling accuracy pt any liability of the A/C Service Station may change this document. Copyright by AUDI AG.
- For A/C compressor allocation ("Zexel / Valeo", "Sanden" or "Denso / Nippondenso"), refer to the ⇒ Electronic Parts Catalog (ETKA) and to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Refrigerant circuits converted from R12 to R134a are to be filled with the quantity indicated in the repair manual "Air conditioner with refrigerant R12". Refer to ⇒ A/C System with Refrigerant R134a (This repair manual is only available in hard copy).
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".

Capacities for Audi A1 (8X_) from MY 2011 10.1.1

- **Expansion Valve**
- Receiver/Dryer
- "Denso", "Sanden" (or "Delphi/Mahle") A/C compressors with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refriger-

ant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A1 (type key 8X1 or 8XA)	From 08/2010 through 06/2014 (running change)	500 + / _ 15	Refrigerant lines bolted to the top of the installed expansion valve
Audi A1 (type key 8XF or 8XK)	From 06/2014 (run- ning change)	475 ⁺ / ₋ 15	Refrigerant lines bolted to the bottom of the installed expansion valve

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- Depending on time period of production and depending on engine, different A/C compressors are installed (these A/C compressors do not have an A/C clutch)
- At the start of production, A/C compressors manufactured by "Denso" type "6 SEU 14C" or "Sanden" type "7 PXE 16/14" were installed. Refer to the ⇒ Electronic Parts Catalog (ET-KA) and ⇒ Heating, Ventilation and Air Conditioning, Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Depending on the engine, A/C compressors from manufacturers "Sanden" type "11 PXC 14" or "Delphi/Mahle" type "6 CVC 140" may also be installed at a later time (introduction TBD, planned from 09/2012). Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- From 11/2012 the refrigerant oil quantity for the "Denso" A/C compressor with the part number "5Q0 xxx xxx" was increased from 80 ccm to 110 ccm. The increased refrigerant oil capacity applies retroactively to all vehicles with this A/C compressor. For vehicles that were built through 11/2012 with this A/C compressor, check whether the refrigerant oil capacity was already topped up during a previous workshop visit. If not, fill the refrigerant circuit with an additional 30 ccm of refrigerant oil. Refer to Refer to ⇒ "10.2.3 Capacities for Audi A1 (8X_) from MY 2011", page 365. Then note the refrigerant oil capacity with a waterproof marker on the sticker and fill the refrigerant circuit with the above-specified refrigerant quantity. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview -A/C System (vehicle-specific repair manual).
- The evaporator, the expansion valve and the associated refrigerant lines were changed from 06/2014 (different lines, attachment points, etc.). These A/C systems were still filled with 500 g (17.6 oz) of refrigerant during production from 06/2014 through 11/2014. The refrigerant capacity was reduced from 500 g to 475 g (17.6 oz to 16.8 oz) from 11/2014. Reason: unfavorable ambient conditions (high ambient temperatures, dirty condenser, etc.) may cause excessive pressures in the refrigerant circuit when the capacity is 500 g (17.6 oz) on these vehicles. For vehicles that were built in this time period, check the capacity specification for the refrigerant on the information label and correct it to 475 g (16.8 oz) with a waterproof pen, if necessary (or replace the information label). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .

10.1.2 Capacities for Audi A2 (8Z_) from MY 2001

Features of the refrigerant system:

- Restrictor (colored).
- Reservoir.
- A/C compressor manufacturer "Denso" without A/C clutch and with A/C Compressor Regulator Valve - N280- .

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A2	From 06/2000 to 07/2001	525 ⁺ / ₋ 25	Yellow colored restrictor
	400		Condenser with part number 8Z0 260 401 (403) and index "B" or "C"
	copying for pome 07/2001 tial purpor		Red colored restrictor
	sed by AUDI AG. AUDI AG does not gu rrectness of information in this documer		Condenser part number 8Z0 260 401 (403) with index "D".



Note

- Replacement restrictors with different holes are available (yellow colored 1.54 mm, red colored 1.42 mm).
- Depending on manufacturer, color of red restrictor may tend more towards orange.
- To avoid altering the cooling output of the air conditioner, restrictors with the same hole diameter must only be installed.
- A restrictor with a smaller hole (red colored) and a condenser with smaller internal volume were introduced from MY 2002. The capacity has therefore been changed slightly (condenser -70 g (-2.5 oz), smaller restrictor +50 g (1.8 oz)). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Capacities for Audi A3 (8L_) from MY 10.1.3 1997 and Audi TT (8N_) from MY 1999

Features of the refrigerant system:

- **Expansion Valve**
- Receiver/Dryer
- "Sanden" or "Zexel / Valeo" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .

Capacities Audi A3 (8L_) 1997 to 2004

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A3	From 08/1996	750 + 50	None



- Exclusive use was made at the start of production of "Sanden" A/C compressors. A/C compressors manufactured by "Zexel / Valeo" are also used from MY 1999. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- If no condenser with a flat pipe width of 20 mm is available for Audi A3 as a replacement part, and a condenser with a flat pipe width of 16 mm is installed, only 650 + / - 20 g (-0.7 oz) of refrigerant instead of 750 + 50 g (1.8 oz) may be filled in. In addition, capacity specification must be changed accordingly on sticker (to do so, please observe notes of for private or commercial purposes, in part or in whole, is not Audi TT, refer to ⇒ page 323). permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability rrectness of information in this document. Copyright by AUDI AG.
- with respect to the correction Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".

Capacities Audi TT (8N_) from MY 1999

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi TT	From 10/1998 through to 10/2003 (and from 06/2004 through 08/2004 ⇒ page 323)	750 + 50	• Condenser with flat pipe width of 20 mm. Refer to ⇒ page 324 .
	From 10/2003 (except 06/2004 up to 08/2004 ⇒ page 323)	650 + / _ 20	Condenser with flat pipe width of 16 mm. Refer to ⇒ page 324 .



- Exclusive use was made at the start of production of "Sanden" A/C compressors. A/C compressors manufactured by "Zexel / Valeo" are also used from MY 1999. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87, Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- From MY 2006, the "Zexel / Valeo" designation was changed to "Valeo".
- There was a change in production for Audi TT from 10/2003 (from vehicle identification number (VIN) 8N41015239) from condenser with part number "1J0 820 411 J" (flat pipe width of 20 mm) to condenser with part number "8NO 820 411 A" (flat pipe width of 16 mm). Refer to ⇒ page 324 . From 06/2004 to 08/2004, a certain number of vehicles not specified were equipped again with condensers having a flat pipe width of 20 mm.
- Condensers with a flat pipe width of 16 mm require 120 g (4.2 oz) less of refrigerant than condensers with flat pipe width of 20 mm. Refer to the ⇒ Electronic Parts Catalog (ETKA).
- On the Audi TT, from 10/2003 (for vehicles from VIN 8N41015239) through 06/2004, a condenser with a 16 mm flat pipe width (part number "8N0 820 411 A") was installed and filled with 750 + 50 grams of refrigerant. In addition, these vehicles have an information label with the incorrect filling quantity: 750 grams (or 700 grams in 06/2004) instead of 650 grams. Refer to ⇒ page 324 . Due to overfilling of the system, the A/C compressor may be switched off under certain circumstances (for example high ambient temperatures) since the pressure in the refrigerant circuit is too high; in addition, drivers may complain about the engine performance (for example, rumbling and buzzing sounds, the engine is heavier loaded as the A/C compressor is working steadily against the excessive pressure). Solution: drain refrigerant circuit, then refill correct capacity and replace sticker with one indicating correct capacity specification, or cross out wrong capacity specification on sticker and note correct capacity, for example using a waterproof marker.
- If the condenser is replaced, observe flat pipe dimensions. If a condenser with another flat pipe dimension is installed, the sticker specifying the capacity for refrigerant R134a is also to be replaced, or the old capacity specification is to be removed and the new capacity is to be noted using a waterproof marker, for example. Refer to the ⇒ Electronic Parts Catalog (ETKA) .

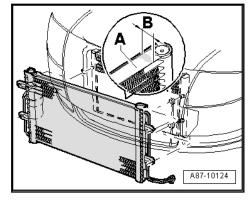
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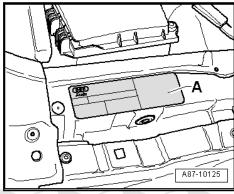
Determining dimensions of flat pipes from condenser

- Flat pipes of condenser -A-
- Width of flat pipes -B-

Sticker for capacity of refrigerant R134a



If the condenser is replaced, observe flat pipe dimensions. If a condenser with different dimensions is installed, the sticker -A- specifying the capacity for refrigerant R134a is also to be replaced, or the old capacity specification is to be removed and the new capacity is to be noted using a waterproof marker, for example. Refer to the ⇒ Electronic Parts Catalog (ETKA).



10.1.4 Capacities for Audi A3 (8P_) from MY 2004 and Audi Q3 (8U_ or 84_ for China) from MY 2012



Note

- The filling capacities provided in the following table apply for the Audi A3, the Audi A3 Sportback, the Audi RS 3, the Audi A3 Cabriolet and the Audi Q3 (and Audi RS Q3).
- Certain versions for China use the designation 84 rather than 8U_.

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- **Expansion Valve**
- Receiver/Dryer
- "Denso", "Delphi/Mahle", "Sanden", or "Zexel / Valeo" A/C compressors with A/C Compressor Regulator Valve -N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the > Electronic Parts Catalog (ETKA).

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A3 • With 4- or 6-cylinder engine	From 05/2003	525 ⁺ / ₋ 25	• None

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi RS 3 • With 5-cylinder engine	From 01/2011	500 + / _ 25	• A different version of the condenser is installed. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual).
Audi Q3 (and RS Q3)	From 07/2011	520 ⁺ / ₋ 20	• None

- Depending on time period of production and depending to the period of production and depending on time period of production and depending of the period of per engine, different A/C compressors are installed (these A/C ne correctness of information in this document. Copyright by AUDI AG. compressors do not have an A/C clutch)
- ♦ At the start production, "Denso" type "7 SEU 16" A/C compressors were installed. From MY 2004, there was a running change to "Denso" compressor type "7 SEU 17".
- Depending on the engine, A/C compressors manufactured by "Zexel / Valeo" (type "DSC17E") and "Sanden" (type "PXE16") are also gradually being installed from MY 2004. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Depending on the engine, A/C compressors manufactured by "Denso" ("6 SEU 14") and "Delphi/Mahle" are also graduálly being installed from MY 2008. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".
- 10.1.5 Capacities for Audi Q2 (GA_) from MY 2017, Audi A3 (8V_ or 85_ for China) from MY 2013, Audi A3 e-tron (8V_) from MY 2015, and Audi RS 3 (8V_) from MY 2016



Note

The capacity for the Audi A3 (8V_ or 85_ for china) applies to all versions (sedan, sportback, and cabriolet etc.)

- **Expansion Valve**
- Receiver/Dryer
- Mechanically driven "Denso" or "Sanden" A/C compressor with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) (all vehicles except A3 e-tron).

For vehicles with a high-voltage system (A3 e-tron), with an electrically-driven "Sanden" or "Visteon" A/C compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi Q2	From 07/2016	500 ⁺ / ₋ 15	• None
Audi A3	From 05/2012	500 ⁺ / ₋ 15	• None
A3 e-tron	From 09/2014	500 ⁺ / ₋ 15	 Electrically-Driven A/C Compressor With second evaporator in the high-voltage battery heat exchanger (chiller)
Audi RS 3 • With 5-cylinder engine	From 02/2015	570 ⁺ / ₋ 15	 A different version of the condenser is installed. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle- specific repair manual).



Note

- Depending on the date of manufacture and the engine, different A/C compressors are installed (these A/C compressors do not have an A/C clutch). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- From 11/2012 the refrigerant oil quantity for the A/C compressor manufacturer "Denso" was increased from 80 ccm to 110 ccm. The increased refrigerant oil capacity applies retroactively to all vehicles with this manufacturer's A/C compressor. On vehicles that were built through 11/2012, check whether the refrigerant oil capacity was already topped up during a previous workshop visit. If not, fill the refrigerant circuit with an additional 30 ccm of refrigerant oil. Refer to Refer to > "10.2.7 Capacities for Audi Q2 (GA) from MY 2017, Audi A3 (8V or 85 for China) from MY 2013, Audi A3 e-tron (8V) from MY 2015, and Audi RS 3 (8V) from MY 2016", page 370. Then note the refrigerant oil capacity with a waterproof marker on the sticker and fill the refrigerant circuit with the above-specified refrigerant quantity. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 Component Location Overview - A/C System (vehicle-specific repair manual).

10.1.6 Capacities for Audi TT (8J_) from MY 2007 commercial purposes, in part or in whole, is not

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- Expansion Valve
- Receiver/Dryer
- "Denso", "Delphi/Mahle" or "Sanden" A/C compressors with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi TT • With 4- or 6-cylinder engine	From 08/2006	525 ⁺ / ₋ 25	None
Audi TT • With 5-cyl- inder en- gine	From 03/2009	500 ⁺ / ₋ 25	A different version of the condenser is installed. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual).



- At the start of production, "Denso" A/C compressors "6 SEU 14" were installed; these A/C compressor do not have an A/C clutch (driven by the engine). A/C compressors from other manufacturers may also be installed at a later time, depending on the engine. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- From MY 2008, "Sanden" A/C compressors (type "PXE16") are also installed as a running change on certain engines; they do not have an A/C clutch (it is driven continuously by the engine). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- With a gradual introduction starting from MY 2011 and depending on the engine, "Delphi" A/C compressors are installed. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

10.1.7 Capacities for Audi TT (FV_) from MY 2015

- **Expansion Valve**
- Receiver/Dryer
- Mechanically driven "Denso" or "Sanden" A/C compressor with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi TT	From 10/2014	500 ⁺ / ₋ 15	None
Audi TT RS • With 5-cyl- inder en- gine	From 07/2016 by of partition of the second o	opyright. Copying for private or commercial as authorise 57,0 Up/ Ag15 Up AG does to the correctness of information in this do	to the ⇒ Electronic Parts Catalog (ET-KA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



Depending on the date of manufacture and the engine, different A/C compressors are installed (these A/C compressors do not have an A/C clutch). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

10.1.8 Capacities for Audi 80 (8A_/8C_), Audi Coupe (8B_) and Audi Cabriolet (8G_) through MY 2002

Features of the refrigerant system:

- Restrictor (not colored).
- Reservoir
- "Zexel / Valeo" A/C compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi 80 Audi Coupe Audi Cabriolet	From 10/1992	 750 + 50 Vehicles with 5-cylinder engine 650 + 50 Vehicles with 4 or 6-cylinder engine 	• None



Note

- Replacement restrictors with different holes are available. If these vehicles are equipped with a yellow colored restrictor, add 50 g (1.8 oz) more refrigerant than specified in the table. After charging, amend capacity stated on label or affix label indicating new capacity.
- In order to distinguish between the two restrictor versions, the one with the smaller hole (1.54 mm) is colored yellow. The restrictor with the larger hole (1.83 mm) is not colored.
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".

10.1.9 Capacities for Audi A4 (8D_) from MY

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Note

Applies to the Audi RS 4.

Features of the refrigerant system:

Restrictor



- Reservoir
- "Denso" or "Zexel / Valeo" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A4	From 11/1994 to 11/1997	650 + 50	Restrictor (not colored)
	From 11/1997	700 + 50	Restrictor colored (yellow)
permitted unless au	ht. Copying for private or commercia thorised by AUDI AG. AUDI AG does e correctness of information in this d	not guarantee or accept any liability	• "Showa/ Keihin" condenser (distinguishing feature, refer to <u>⇒ page 330</u>).
	From 11/1998	550 + 50	Restrictor colored (yellow)
(ervv	n	• "AWG" condenser (distinguishing feature, refer to ⇒ page 330).
Audi RS 4	From 05/2000	650 + 50	Restrictor colored (yellow)

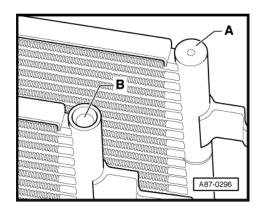


- Restrictors with a modified hole have been installed at the factory from 11/1997 (yellow colored). The capacity was increased by 50 g (1.8 oz) for vehicles with yellow colored restrictor.
- In order to distinguish between the two restrictor versions, the one with the smaller hole (1.54 mm) is colored yellow. The restrictor with the larger hole (1.83 mm) is not colored.
- The Audi A4 was equipped with different A/C compressors depending on engine and production period. Exclusive use was made at the start of production of "Zexel / Valeo" A/C compressors. From MY 1996, "Denso" A/C compressors were gradually introduced for vehicles with 6-cylinder en-
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".
- Replacement restrictors with different holes (not colored, vellow colored, red colored) are available. If a vehicle is equipped with a different restrictor, add more or less refrigerant depending on type (⇒ table). After charging, amend capacity stated on label or affix label indicating new capacity.
- Depending on manufacturer, color of red restrictor may tend more towards orange.
- As of 11/1998, Audi A4 models have also been required by copyright. Copying for private or commercial purposes, in part or in whole, is not been required by AUDI AG. AUDI AG does not guarantee or accept any liability with "AWG" condensers (initially approximately 10,000 tve-orrectness of information in this document. Copyright by AUDI AG. hicles, from vehicle identification number (VIN) 8DXA 065 253 to 8DXA 077 026). The specified capacity for vehicles with these condensers differs from those with "Showa/Keihin"condensers. The condensers can be identified on the basis of certain characteristic features. Refer to ⇒ page 330
- If the condenser installed is replaced by one with a different part number, check the capacity indicated on the label in the vehicle and correct if necessary or affix a label with the correct capacity over the existing one. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System for the (vehicle-specific repair manual) and to the ⇒ Electronic Parts Catalog (ETKA).

Distinguishing features between "Showa/ Keihin" and "AWG" condensers

Different manifolds:

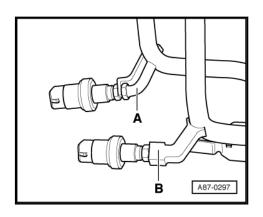
- A Manifold on "Showa/ Keihin" Condenser.
- B Manifold on "AWG" Condenser.



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Different connections to pressure switch.

- A Connection Area on "Showa/ Keihin" Condenser.
- B Connection Area on "AWG" Condenser.



10.1.10 Capacities for A4 (8E_) from MY 2001 and Audi A4 Cabriolet (8H_) from MY 2003



Note

Applies to the Audi RS 4.

Features of the refrigerant system:

- Restrictor (yellow or red colored).
- Reservoir
- "Denso" A/C compressor with A/C Compressor Regulator Valve - N280- (without A/C clutch)

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A4	From 11/2000	500 + / _ 20	Restrictor yellow or red colored
Audi RS 4	From 07/2005	440 + / _ 20	Red colored restrictor



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- Replacement restrictors with different holes are available: Yellow colored 1.54 mm, red colored 1.42 mm.
- Depending on manufacturer, color of red restrictor may tend more towards orange.
- To avoid altering the cooling output of the air conditioner, red or yellow colored restrictors must only be installed. Yellow colored restrictors were installed in MY 2001. Red colored restrictors were installed from MY 2002. The restrictor modification (a red colored restrictor may also be installed in vehicles of MY 2001 instead of a yellow colored restrictor) does not alter the capacity for these vehicles.
- Depending on time period of production and depending on engine, different A/C compressors are installed (these A/C compressors do not have an A/C clutch)
- At the start production, "Denso" A/C compressors "6 SEU 12" and "7 SEU 16" were installed. From MY 2004, there was a running change to other "Denso" compressor types ("6 SEU 14" and "7 SEU 17"). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA)
- The Audi RS 4 has an condenser with a smaller internal volume, therefore the capacity for this model is less than for other models. Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- 10.1.11 Capacities for Audi A4 (8K_) from MY 2008, Audi A5 Coupe and Sportback (8T_) from MY 2008, Audi Q5 (8R_ or 83_for, China), from MYv2008, Audi A5 in part or in whole, is not

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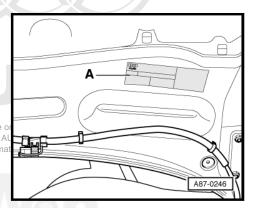
Cabriolet (8F_) from MY 2009, and Audi Q5 Hybrid (8R) from MY 2011



- Also applies to the Audi RS 4, Audi S 5, Audi SQ5 and Audi RS 5.
- Different capacities, depending on the version and the vehicle date of manufacture (see the following tables).
- Certain versions of the Audi Q5 for China use the design AUDI AG. A tion 83 rather than 8R.
- An information label -A- with refrigerant R134a capacity information for the respective refrigerant circuit can be found in the engine compartment (shown here on the hood). These information label provides information about the capacity of refrigerant R134a (for the refrigerant R134a when the vehicle is manufactured). If this label is not present or the correct filling capacities are not clear (if the condenser was replaced for example) then compare the information on the label to the information in the following tables. If the information is not the same, the label -A- with the filling capacity information for the refrigerant R134a should be replaced if necessary or the old capacity information should be removed from the label and the new capacity information should be written in with a waterproof marker. Refer to the ⇒ Electronic Parts Catalog (ETKA) .



- **Expansion Valve**
- Receiver/Dryer
- Refrigerant line with inner heat exchanger
- Mechanically driven "Denso" A/C compressor, with A/C Compressor Regulator Valve - N280- (and depending on engine, also with an A/C Clutch - N25- from MY 2012). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) (all vehicles except on the Audi Q5 Hybrid).
- Vehicles with a high-voltage system (Audi Q5 Hybrid) have electrically-driven "Denso" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA)
- Different version condensers (and for this reason different filling capacities for refrigerant R134a)
- Capacities for Audi A4, Audi A5 and Audi A5 Cabriolet. Refer to \Rightarrow page 334.
- Capacities for Audi Q5 and Audi Q5 Hybrid. Refer to ⇒ page
- Capacities for Audi RS 4 and Audi RS 5. Refer to ⇒ page
- Condenser distinguishing marks. Refer to ⇒ page 342.





Audi A4, Audi A5 and Audi A5 Cabriolet



- ♦ Also applies to the Audi S 5.
- ◆ Capacity for the Audi RS 5 Cabriolet. Refer to <u>⇒ page 341</u>.

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A4 and Audi A5 (Coupe, Cab- riolet and	◆ Audi A4, from 10/2007 through 03/2012	570 ⁺ / ₋ 20	A/C compressor without A/C clutch and with the part number 8K0 xxx xxx (manufactured by "Denso", type "6 SEU 14" or "7 SEU 17")
Sportback)	◆ Audi A5 Coupe and Sportback from 05/2007 through 03/2012		A/C compressor with A/C clutch and with the part number 8T0 xxx xxx (manufactured by "Denso", type "6 SAS 14")
	◆ Audi A5 Cabrio- let from 03/2009 through 03/2012		• Condenser with the part number 8K0 xxx xxx manufactured by "Denso" or "Showa / Keihin". Refer to ⇒ page 342 for differences.
	03/2012		For vehicles with a 4-, 6- or 8-cylinder engine (excluding Audi RS 5)
	From 03/2012 to 10/2013 (run- ning changes, see notes)	550 ⁺ / ₋ 15	A/C compressor with the part number 8T0 xxx xxx ("Denso" manufacturer with and without solenoid coupling type "6 SES 14" or "6 SAS 14")
		Protected by c permitted unle	ess authorised by AUDI AG. AUDI AG does no guarante or accept any
		with respec	• The condensers of information in this document. Convict by ADDI A The condensers are predominately installed in vehicles with a 4-cylinder engine and are manufactured by "Denso".
			Condenser with part number 8T0 xxx xxx manufactured by "Showa / Keihin" with the same part number from the index "D" are installed as a running change on all vehicles with 4-cylinder or 6-cylinder engines from 10/2013.



Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
		630 ⁺ / ₋ 15	A/C compressor with the part number 8T0 xxx xxx ("Denso" manufacturer with and without solenoid coupling type "6 SES 14" or "6 SAS 14")
			• Condenser with part number 8T0 xxx xxx manufactured by "Showa / Keihin" until the index "C". (Difference, refer to ⇒ page 342).
			Condenser with part number 8T0 xxx xxx manufactured by "Showa / Keihin" through index "C" are predominately installed through 10/2013 on vehicles with a 6-cylinder engine.
			If instead of the condenser with the part number 8T0 xxx xxx through index "C", a condenser with the part number 8T0 xxx xxx from the index "D" is installed from 10/2013, the reduced filling capacity applies.
	From 10/2013 (gradual introduc- tion)	550 ⁺ / ₋ 15	◆ A/C compressor (manufacturer "Den- so") all versions, drive via a belt with and without magnetic coupling.
			◆ Condenser with part number 8T0 xxx xxx manufactured by "Showa / Keihin" from the index "D". (Difference, refer to page 342).
	\		 Does not apply to certain vehicles that were manufactured in China. Refer to the notes.
	From 06/2012 (only for specific vehicles manufactured in China, see notes)	600 + / _ 15	A/C compressor with the part number 8T0 xxx xxx ("Denso" manufacturer with and without solenoid coupling type "6 SES 14" or "6 SAS 14")
	nermi	ted by copyright. Copying for private or cor ted unless authorised by AUDI AG. AUDI respect to the correctness of information	(characteristic differences, refer to >
		er\\	Currently this condenser made by "Showa / Keihin" is only installed in the vehicles manufactured in China.



- Starting from the production date in 03/2012, 8-cylinder engines will no longer be available for the Audi A4 and Audi A5 (excluding the RS models).
- At the start of production, A/C compressors manufactured by "Denso" (type "6 SEU 14" on vehicles with a 4- and 6-cylinder engine and type "7 SEU 17" on vehicles with an 8-cylinder engine) were installed. These A/C compressors do not have an A/C clutch (they are driven continuously by the engine). In MY 2012, the A/C compressor type "6 SEU 14" was gradually replaced by type "6 SES 14". A/C compressors from other manufacturers may also be installed at a later time, depending on the engine. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- For certain engines (for example, vehicles with a 4-cylinder TDI engine) and versions, A/C compressors (type "6 SAS 14") are gradually being used from MY 2012 that have an additional A/C Clutch - N25- installed on the belt pulley. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).
- A/C compressors with an installed A/C Clutch N26- is being gradually installed on specific 4-cylinder TDI engines starting from 08/2011. Refer to ⇒ Electronic Parts Catalog (ETKA).
- From 03/2012, the refrigerant circuit (A/C compressor, condenser, evaporator etc.) was gradually changed depending on the engine. This resulted in a different capacity for the refrigerant (identifiable by the information label for the refrigerant circuit) and the refrigerant oil for these vehicles. Refer to Refer to = "10.2.13 Capacities for Audi A4 (8K_) from MY <u> 2008, Audi A5 Coupe and Sportback (8T_) from MY 2008,</u> Audi Q5 (8R or 83 for China) from MY 2008, Audi A5
 Cabriolet (8F) from MY 2009, and Audi Q5 Hybrid (8R)
 from MY 2011", page 379 and ⇒ Heating, Ventilation and
 Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual) and the effectionic Botto. specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- From 06/2012, a "Showa / Keihin" condenser (part number 8KD xxx xxx) is gradually being installed in vehicles that are manufactured in Chinay This condenser has a different inner in part or in whole, is not construction, for this reason there is another filling specific copyright by AUDI AG. tion of the coolant. For the characteristics, refer to <u>⇒ page</u>
- From 10/2013 as a running change, a condenser from the manufacturer "Showa / Keihin" with the part number 8T0 xxx xxx from the index "D" is installed on all vehicles (except the RS models). This condenser has a different construction (smaller height of the flat pipes, 1.5 instead of 2.0 and with this a smaller interior volume) than the "Showa / Keihin" condenser with the part number 8T0 xxx xxx up to the index "C", for this reason there is another filling specification of the coolant. For the characteristics, refer to ⇒ page 342
- If in a vehicle, in the condenser from the manufacturer "Showa / Keihin" with the part number 8T0 xxx xxx until the index "C" (or a condenser with the part number 8K0 xxx xxx or 8KD xxx xxx) is installed, a condenser from the manufacturer "Showa / Keihin" with the part number 8T0 xxx xxx from the index "D" or a condenser from the manufacturer "Denso", then for these condensers fill with the specified capacity. (see the table). The same applies if a condenser from the



manufacturer "Denso" if replaced with a condenser from another manufacturer of with another part number. In addition, the capacity specified on the label in the vehicle is to be checked and amended if necessary, or the existing label is to be replaced with one indicating the correct capacity (affix over old label).

- The changed components (A/C compressor, condenser) can only be differentiated by the part number on the outside (data plate on the A/C compressor, data plate or impression on the condenser). Refer to <u>⇒ page 342</u> and the ⇒ Electronic Parts Catalog (ETKA) .
- Condenser distinguishing marks. Refer to ⇒ page 342.

Audi Q5 and Audi Q5 Hybrid



Note

Applies also to the Audi SQ5.

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi Q5	From 09/2008 through 06/2012 / 08/2012 (gradual change, see notes)	570 + / - 20	A/C compressor without A/C clutch and with the part number 8K0 xxx xxx (manufactured by "Denso", type "6 SEU 14")
Prot	ected by copyright. Copying for	private or commercial purposes, in part or or	A/C compressor with A/C clutch and with the part number 8T0 xxx xxx type "6,SAS 14"
per V	mitted unless authorised by AUI ith respect to the correctness o	AG. AUDI AG does not guarantee or acc f information in this document. Copyright by	AUD Condenser with the part number 8K0 xxx xxx manufactured by "Denso" or "Showa / Keihin". Refer to <u>⇒ page 342</u> for differences.
	From 06/2012 / 08/2012 to 10/2013 (running changes, see notes)	550 ⁺ / ₋ 15	A/C compressor with the part number 8T0 xxx xxx ("Denso" manufacturer with and without solenoid coupling type "6 SES 14" or "6 SAS 14")
			Condenser with part number 8T0 xxx xxx manufactured by "Denso" or the manufacturer "Showa / Keihin" with the same part number from the index "D" (Differences, refer to ⇒ page 342).
			These condensers manufactured by "Denso" are currently not installed on the Audi Q5. (Predominantly installed on the Audi A4 and A5 with a 4-cylinder engine, and the introduction on the Audi Q5 is not finalized). For the characteristics, refer to ⇒ page 342.
			The condensers from the manufacturer "Showa / Keihin" with the part number 8T0 xxx xxx from the index "D" are installed from 10/2013 on all vehicles as a running change.



Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
	From 06/2012 / 08/2012 to 10/2013 (running changes, see notes)	630 + / _ 15	A/C compressor with the part number 8T0 xxx xxx ("Denso" manufacturer with and without solenoid coupling type "6 SES 14" or "6 SAS 14")
			 Condenser with part number 8T0 xxx xxx manufactured by "Showa / Keihin" until the index "C". (Difference, refer to ⇒ page 342).
	Protected by convir	ght. Copying for private or commercial purp	This condenser from the manufacturer "Showa / Keihin" with the part number 8T0 xxx xxx until the index "C" is installed on the Audi Q5 from the conversion to 06/2012 or 08/2012 (replacement "Denso" condenser for the Audi Q5 is not yet finalized, for vehicles manufactured in China see below).
	permitted unless at	the correctness of information in this docume	oaranlfoinstead of the condenser with the
	From 10/2013 (gradual introduc- tion)	550 ⁺ / ₋ 15	◆ A/C compressor (manufacturer "Den- so") all versions, drive via a belt with and without magnetic coupling.
			◆ Condenser with part number 8T0 xxx xxx manufactured by "Showa / Keihin" from the index "D". (Difference, refer to ⇒ page 342).
			 Does not apply to certain vehicles that were manufactured in China. Refer to the notes.
	From 08/2012 (only for specific vehicles manufactured in China, see notes)	600 ⁺ / ₋ 15	A/C compressor with the part number 8T0 xxx xxx ("Denso" manufacturer with and without solenoid coupling type "6 SES 14" or "6 SAS 14")
			 Condenser with part number 8KD xxx xxx manufactured by "Showa / Keihin" (characteristic differences, refer to ⇒ page 342).
			 The condenser from the manufacturer "Showa / Keihin" with the part number 8KD xxx xxx, is at this time only instal- led in vehicles that are manufactured in China.
			If a condenser with another part number (for example 8T0 xxx xxx from index "D") is installed instead of the condenser with the part number 8KD xxx xxx, then the capacity specified for this condenser applies.



Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi Q5 Hy- brid	From 05/2011 to 07/2012 (see notes)	840 ⁺ / ₋ 20 (see notes)	 Electrically-Driven A/C Compressor Condenser with part number 8R0 xxx xxx manufactured by "Denso" (characteristics, refer to ⇒ page 342).
			The Climatronic Control Module - J255- A/C display control head with a part number 8Rx xxx xxx and an A/C unit with a part number 8Kx xxx xxx. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation, and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
			With second evaporator in the battery cooling module
	From 07/2012	900 ⁺ / ₋ 15 ◆ Originally these vehicles were filled with 840 g (29.6 oz) of refrigerant from 07/2012 until 10/2013, then the capacity was raised to 900 g (31.7 oz) (see notes).	 Electrically-Driven A/C Compressor Condenser with part number 8R0 xxx xxx manufactured by "Denso" (characteristics, refer to ⇒ page 342). The Climatronic Control Module - J255- A/C display control head with a part number 8Kx xxx xxx and an A/C unit with a part number 8Tx xxx xxx. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation, and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
			With second evaporator in the battery cooling module

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- At the start of production, mechanically driven A/C compressors manufactured by "Denso" (for example, type "6 SEU 14") were installed on all vehicles (except on the Audi Q5 Hybrid). These A/C compressors do not have an A/C clutch (they are continuously driven by the engine). In MY 2012, the A/C compressor type "6 SEU 14" was gradually replaced by type "6 SES 14". A/C compressors from other manufacturers may also be installed at a later time, depending on the engine. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- For certain engines (for example, vehicles with a 4-cylinder TDI engine) and versions, A/C compressors (type "6 SAS" 14") are gradually being used from MY 2012 that have an additional A/C Clutch - N25- installed on the belt pulley. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA)
- A/C compressors with an installed A/C Clutch N26- is being *gradually installed on specific A-cylinder of Dhengines starting*es, in part or in whole, is not *from 08/2011. Referitö⇔urElectronic Parts Catalog (EFKA*l)guarantee or accept any liability ent. Copyright by AUDI AG.
- From 06/2012, the refrigerant circuit (A/C compressor, condenser, evaporator etc.) was gradually changed depending on the engine. This resulted in a different capacity for the refrigerant (identifiable by the information label for the refrigerant circuit) and the refrigerant oil for these vehicles. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- From 06/2012, vehicles manufactured in China, are being installed with a condenser manufactured by "Showa / Keihin" (part number 8KD xxx xxx) as a running change. This condenser has a different inner construction, for this reason there is another filling specification of the coolant. For the characteristics, refer to ⇒ page 342 .
- From 10/2013 as a running change, a condenser from the manufacturer "Showa / Keihin" with the part number 8T0 xxx xxx from the index "D" is installed on all vehicles (except the RS models). This condenser has a different construction (smaller height of the flat pipes, 1.5 instead of 2.0 and with this a smaller interior volume) than the "Showa / Keihin" condenser with the part number 8T0 xxx xxx up to the index "C", for this reason there is another filling specification of the coolant. For the characteristics, refer to ⇒ page 342.
- If in a vehicle, in the condenser from the manufacturer "Showa / Keihin" with the part number 8T0 xxx xxx until the index "C" (or a condenser with the part number 8K0 xxx xxx or 8KD xxx xxx) is installed, a condenser from the manufacturer "Showa / Keihin" with the part number 8T0 xxx xxx from the index "D" or a condenser from the manufacturer "Denso", then for these condensers fill with the specified capacity (see the table). The same applies if a condenser from the manufacturer "Denso" if replaced with a condenser from another manufacturer of with another part number. In addition, the capacity specified on the label in the vehicle is to be checked and amended if necessary, or the existing label is to be replaced with one indicating the correct capacity (affix over old label).
- The changed components (A/C compressor, condenser) can only be differentiated by the part number on the outside (data plate on the A/C compressor, data plate or impression on



the condenser). Refer to ⇒ page 342 and the ⇒ Electronic Parts Catalog (ETKA) .

- An electrical A/C compressor manufactured by "Denso" (Electrical A/C Compressor - V470- with A/C Compressor Control Module - J842-) is installed at the start of production on the Audi Q5 Hybrid. There is no A/C Compressor Regulator Valve - N280- present in this A/C compressor.
- From 10/2013 the refrigerant amount for the refrigerant circuit on the Audi Q5 Hybrid is raised from 840 g to 900 g (29.6 oz to 31.7 oz). The raised capacity for the refrigerant applies retroactively to all vehicles from 07/2012 at the next filling with a Climatronic Control Module - J255- A/C display and control head with the part number 8Kx xxx xxx and an AC unit with the part number 8Tx xxx xxx (different software and different evaporator in AC unit). The coolant circuit does not have to be emptied, to fill it with the raised capacity. Here it is sufficient, when there is a raised capacity for example after working on the refrigerant circuit for which the emptying and refilling already is necessary, to fill. For vehicles which were built from 10/2013 check whether the refrigerant oil capacity was possibly filled during a previous workshop. If not, check the capacity table for the refrigerant on the data label and if necessary, attach a new label with the correct capacity and language. Refer to ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual). If there is no information label available with the correct capacity and language, amend the capacity information on the existing information label accordingly using a waterproof marker. It necessary, fill the refrigerant circuit with the above-specified higher refrigerant amount.
- Condenser distinguishing marks. Refer to ⇒ page 34.

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Note

Also applies to the Audi RS 5 Cabriolet.

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi RS 4 and Audi RS 5	◆ RS 4 from 05/2012 ◆ RS 5 from 03/2010	570 ⁺ / ₋ 20	A/C compressor without A/C clutch and with the part number 8K0 xxx xxx (manufactured by "Denso", type "7 SEU 17". Condenser with part number 8K0 xxx
			xxx (manufactured by "Denso", defining characteristics, refer to <u>⇒ page</u> 342)



- At the start of production, A/C compressors manufactured by "Denso" (type "7 SEU 17") were installed. These A/C compressors do not have an A/C clutch (they are driven continuously by the engine). A/C compressors from other manufacturers may also be installed at a later time, depending on the engine. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- The refrigerant circuit on the Audi RS 4 and RS5 will not be changed over in MY 2012 (refer to the other versions).

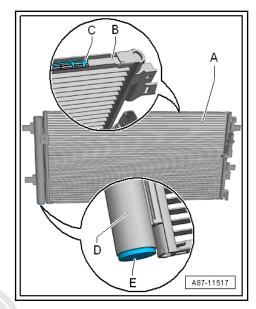
Condenser distinguishing marks



- Depending on when the vehicle was manufactured, on the version of the vehicle and on the engine, different condensers are installed on these vehicles. Refer to the ⇒ Electronic Parts Catalog (ETKA) . These condensers differ in their inner construction and volume. The refrigerant circuit capacity depends on the condenser. Always see which version of the condenser is installed when determining the refrigerant capacity.
- Currently condensers made by different manufacturers are being installed ("Denso" and "Showa / Keihin"). Each has specific distinguishing marks.
- A condenser from one manufacturer can have a different construction but also from the outside only the part number at. Copying for private or commercial purposes, in part or in whole, is not is different. The construction (different flow distribution sdiff thorised by AUDI AG. AUDI AG does not guarantee or accept any liability ferent inner volume) determines the refrigerant capacity for the refrigerant circuit. Refer to Refer to ⇒ "3.2.3 Condenser", *page 27* .
- This condenser comes in different designs for different versions (identified, for example by the part number 8K0 xxx xxx , 8Rx xxx xxx, 8KD xxx xxx or 8T0 xxx xxx). Refer to Refer to ⇒ "3.2.3 Condenser", page 27 and to the ⇒ Electronic Parts Catalog (ETKA) for the allocation.

Identifying a condenser made by "Denso" -A-

- The upper sealing strip -B- is U-shaped.
- Condenser manufacturer part number and manufacturer information -C- (currently printed directly on it). Refer to the ⇒ Electronic Parts Catalog (ETKA) for the allocation.
- The receiver/dryer -D- is integrated on the condenser (the dryer cartridge can be replaced when the plastic screw / cap -E- is removed). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



Identifying a condenser made by "Showa / Keihin" -A-

- The upper sealing strip -B- is flat.
- Condenser manufacturer part number and manufacturing date -C- (currently on a data plate glued to it). Refer to the ⇒ Electronic Parts Catalog (ETKA) for the allocation.
- The receiver/dryer -D- is attached to the condenser (the receiver/dryer -D- can be replaced after removing the bolts -E-). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).



Note

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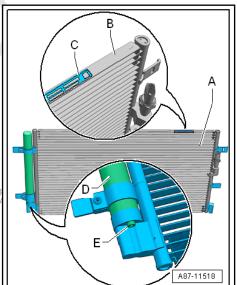
From 10/2013 as a running change, a condenser from the manufacturer "Showa / Keihin" with the part number 8T0 xxx xxx from the index "D" is installed on all vehicles (except the RS models). This condenser has a different construction (smaller height of the flat pipes, 1.5 instead of 2.0 and with this a smaller interior volume) than the "Showa / Keihin" condenser with the part number 8T0 xxx xxx up to the index "C", for this reason there is another filling specification of the coolant. The condensers part numbers can vary, the different heights of the flat pipe cannot be defiantly determined using workshop tools.

10.1.12 Capacities for Audi A4 (8W_) from MY 2016, Audi A4 (86_ for China) from MY 2017, Audi A5 (F5_) from MY 2016, Audi Q5 (FY_) from MY 2017, Audi Q5 (87_ China) from MY 2019



Note

Applies to the Audi A4 allroad, the Audi A4 (type 86 for China), the Audi A5 (all versions), the Audi Q5 (type 87_ for China) as well as S and RS models.



- **Expansion Valve**
- Receiver/Dryer
- Refrigerant line with inner heat exchanger
- Mechanical A/C compressor manufactured by "Denso" or "Sanden" with A/C Compressor Regulator Valve - N280with or without A/C Clutch - N25- (depending on the engine). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A4 Audi A5 Audi Q5	From 07/2015	590 + / - 15	• None

10.1.13 Capacities for Audi 100 / Audi A6 (4A_) through MY 1998

- Restrictor (not colored)
- Reservoir
- "Denso" or "Zexel / Valeo" A/C compressors. Refer to

 ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87;
 Refrigerant Circuit (vehicle specific repair manual) and the liability ⇒ Electronic Parts Catalog (ETKA) this document. Copyright by AUDI AG.

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi 100/ Audi A6	From 10/1992 to 03/1997	750 + 50	None





- If a vehicle is equipped with a yellow colored restrictor as replacement for a non-colored restrictor, add 50 g (1.8 oz) more refrigerant than specified in the table. In addition, the capacity specified on the label in the vehicle is to be checked and amended if necessary, or the existing label is to be replaced with one indicating the correct capacity (affix over old label).
- Restrictors with a modified hole have been installed at the factory since 11/1997 (colored). In order to distinguish between the two restrictor versions, the one with the smaller hole (1.54 mm) is colored yellow. The restrictor with the larger hole (1.83 mm) is not colored.
- The Audi 100 and Audi A6 were equipped with different A/C compressors depending on engine and production period. Exclusive use was made at the start of production of "Zexel / Valeo" A/C compressors. From MY 1996, "Denso" A/C compressors were gradually introduced for vehicles with 6-cylinder engines.
- From MY 2006, the "Zexel / Valeo" designation was changed to "Valeo".
- From 09/1994, production was gradually switched from condenser 4A0 260 403 AB to condenser 4A0 260 403 AC.
- The refrigerant capacity of 750+50 g applies to all Audi 100 (regardless of condenser).
- Only condensers with part number 4A0 260 403 AC are now available as replacement parts (if necessary, make use of label part number 8A0 010 126 P).
- After charging refrigerant circuit on vehicles manufactured through 10/1994, check the capacity stated on label in vehicle and correct if necessary, or affix a label with the correct capacity part number 8A0 010 126 P over the existing one (modified capacity). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .



10.1.14 Capacities for Audi A6 (4B_) from MY 1998 and Audi Allroad (4B_) through MY 2005

- Restrictor
- Reservoir
- "Denso" or "Zexel / Valeo" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ET-KA) .

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A6	From 04/1997	800 + 50	Restrictor (not colored)
	to 11/1997		A/C unit version "1". Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual).
			• Condenser with flat pipe dimensions 20 mm x 3 mm. Refer to ⇒ page 350 .
	From 11/1997	850 + 50	Restrictor colored (yellow)
permitted unless a	through 08/1998 ght. Copying to private of commercial uthorised by AUDI AG. AUDI AG does te correctness of information in this do	es not guarantee or accept any liability	A/C unit version "1". Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual).
	GLAN	n	• Condenser with flat pipe dimensions 20 mm x 3 mm. Refer to ⇒ page 350.

- Restrictors with a modified hole have been installed at the factory from 11/1997 (yellow colored). The capacity was increased by 50 g (1.8 oz) for vehicles in which a yellow colored restrictor was installed.
- In order to distinguish between the two restrictor versions, the one with the smaller hole (1.54 mm) is colored yellow. The restrictor with the larger hole (1.83 mm) is not colored.
- If a vehicle is equipped with a colored restrictor as replacement for a non-colored restrictor, add 50 g (1.8 oz) more refrigerant than specified in the table. In addition, the capacity specified on the label in the vehicle is to be checked and amended if necessary, or the existing label is to be replaced with one indicating the correct capacity (affix over old label).
- The Audi A6 are equipped with different A/C compressors depending on engine and vehicle date of manufacture.
- Production was gradually switched in 08-09/1998 from A/C unit version "1" to A/C unit version "2". Since the evaporator was also changed along with the A/C unit, the capacity could have been reduced.
- The two A/C unit versions can be identified on the basis of certain characteristics described in the vehicle-specific repair manual. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".



Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A6 • With 4-cylinder engine • With 6-cylinder gasoline engine	From 08/1998 to 04/1999	750 + 50	Restrictor colored (yellow) A/C unit version "2". Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual). Condenser with part number 4B0 260 401 (403) and index "D", "E" or "F" (flat pipe dimensions 20 mm x 3 mm, refer to ⇒ page 350). Refer to the ⇒ Electronic Parts Catalog (ETKA).
Audi A6 • With 6-cyl- inder die- sel engine	 From 08/1998 to 10/1998 From 12/1998 to 10/1999 (see notes) 	750 + 50	 Restrictor colored (yellow) A/C unit version "2". Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual). Condenser with part number 4B0 260 401 (403) and index "D", "E" or "F" (flat pipe dimensions 20 mm x 3 mm, refer to ⇒ page 350). Refer to the ⇒ Electronic Parts Catalog (ETKA).

Vehicle type	Production period	Capacity in grams Protected by copyright. Copying	Differing features of this refrigerant cir- ng for private or commercial pounts es, in part or in whole, is no
Audi A6/ Audi allroad • With 6-cyl- inder die- sel engine	 From 10/1998 to 12/1998 From 10/1999 (see notes) 	wii 550 ±t 50 ne correctr	 Restrictor colored (yellow) by AUDI AG. A/C unit version "2 or 3". Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual). Condenser with part number 4B0 260 401 (403) and index "G" or "R" (flat pipe dimensions 16 mm x 1.7 mm, refer to ⇒ page 350). Refer to the ⇒ Electronic Parts Catalog (ET-KA).

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A6/ Audi allroad • With 4-cyl- inder en- gine ex- cept 2.0L	From 04/1999	650 + 50	 Restrictor colored (yellow) A/C unit version "2 or 3". Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual).
With 6-cylinder gasoline engine except 3.0L engine			• Condenser with part no. 4B0 260 401(403) and index "H", "J", "K", "S", "T" or "N" (flat pipe dimensions 18 mm x 1.7 mm ⇒ page 350). Refer to the ⇒ Electronic Parts Catalog (ETKA).
With a 6- cylinder diesel en- gine (see note)			(Endy)
Audi A6 • With 4-cylinder 2.0L engine • With 6-cylinder 3.0L	From 05/2001	550 + 50	 Restrictor colored (yellow) A/C unit version "3". Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual).
engine		Protected by copyright. Copy permitted unless authorised with respect to the correct	py Au 260 401 (403) and index A (flat pipe billing as dimensions 18 mm x 1 7 mm , 4 re + AG. fer to ⇒ page 350). Refer to the ⇒ Electronic Parts Catalog (ETKA).
		e	A/C Compressor Regulator Valve - N280-





- Condensers with A/C Pressure Switch F129- or High Pressure Sensor - G65- are supplied for production as part number XXX XXX 401 X. As a replacement part, this condenser is supplied without A/C Pressure Switch - F129- or High Pressure Sensor - G65- as part number XXX XXX 403 X.
- ♦ From 10/1998 to 12/1998, vehicles with 6-cylinder diesel engine (initially about 10,000 vehicles) were equipped with condensers of a different design. The capacity is different for vehicles with these condensers. The condensers can be identified on the basis of certain characteristics and the part number. Refer to ⇒ page 350 .
- The Audi A6 are equipped with different A/C compressors depending on engine and vehicle date of manufacture.
- On condenser replacement, observe part number index (different flat pipe versions, flat pipe dimensions 16 x 1.7 mm, 18 mm x 1.7 mm or 20 mm x 3 mm) and the different capacities involved. If a condenser with a different part number index is installed, the capacity specified on the label must be checked and amended if necessary or a label indicating the modified capacity must be affixed over the existing label. The part number can be found on a sticker affixed on the underside of the condenser.
- From 04/1999, production was gradually switched from condensers with flat pipe dimensions 20 mm x 3 mm to condensers with flat pipe dimensions 18 mm x 1.7 mm or 16 mm x 1.7 mm. The change in production took place gradually during the course of 1999 depending on the engine and existing supplies of the different versions. Correct allocation of the different condensers. Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- For vehicles from 04/1999 that are equipped with 6-cylinder diesel engine, a condenser with index "D", "G", "R" or "K" may be installed. Pay attention to the different capacities. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Overview - A/C System (vehicle-specific repair manual) and to the ⇒ Electronic Parts Catalog (ETKA).

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A6 • With 8-cyl- inder en- gine	• With 8-cyl- inder en- And again	unless autho 550 JA50 AG. AUDI AG spect to the correctness of information in	Nestrictor colored (yellow) his document. Copyright by AUDI AG. A/C unit version "2 or 3". Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual).
			Condenser with part number 4B3 260 401 (403) B, D, E (flat pipe dimensions 18 mm x 1.7 mm ⇒ page 350). Refer to the ⇒ Electronic Parts Catalog (ETKA) .

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A6 • With 8-cyl- inder en- gine	From 03/1999 to 02/2000	650 + 50	 Restrictor colored (yellow) A/C unit version "2". Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual). Condenser with part number 4B3 260 401 (403) C (flat pipe dimensions 18 mm x 1.7 mm ⇒ page 350). Refer to the ⇒ Electronic Parts Catalog (ETKA).



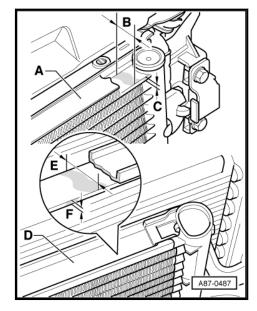
- The 8-cylinder Audi A6 has a "Denso" A/C compressor.
- Production was gradually converted in 08-09/1998 from A/C cylinder engine are only equipped with A/C unit as of version "2". unit version "1" to A/C unit version "2". Vehicles with an 8-
- The different A/C unit versions can be identified on the basis of certain characteristics described in the repair manual. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual).
- For vehicles with 8-cylinder engines, different condensers were installed. Exclusive use was made for USA vehicles of condensers with part number 4B3 260 401 (403) C, D, E.
- In 03/1999, production was gradually switched from condensers with part number 4B3 260 401 (403) B to condensers with part number 4B3 260 401 (403) C.
- If the condenser installed is replaced by a condenser with a different part number, the capacity specified on the label opying for private or commercial purposes, in part or in whole, is not must be amended and, if necessary, the label indicating the d by AUDI AG. AUDI AG does not guarantee or accept any liability ectness of information in this document. Copyright by AUDI AG. modified capacity must be affixed over the existing label. The part number can be found on a sticker attached to the bottom of the condenser. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual) and ⇒ Electronic Parts Catalog (ETKA) .

Determining dimensions of flat pipes from condenser

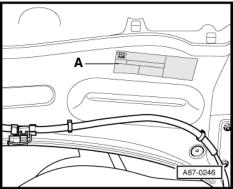


- Production was gradually switched to a condenser with smaller flat pipes starting from 11/08/1998 (initially on Audi A6 with a 6-cylinder diesel engine).
- Observe the part number when replacing a condenser (sometimes the only distinguishing feature). Refer to the ⇒ Electronic Parts Catalog (ETKA) .

Condensers -A- with flat pipe dimensions -B- = 20 mm and -C-= 3.0 mm must be filled with more refrigerant than condensers -D- with flat pipe dimensions -E- = 18 mm or 16 mm and -F- = 1.7 mm. Refer to the ⇒ Electronic Parts Catalog (ETKA) .



If the condenser is replaced, observe flat pipe dimensions. If a condenser with different dimensions is installed, the sticker -A- specifying the capacity for refrigerant R134a is also to be replaced, or the old capacity specification is to be removed and the new capacity is to be noted, for example using a waterproof marker. Refer to the ⇒ Electronic Parts Catalog (ETKA).



10.1.15 Capacities for Audi A6 (4F_) from MY 2005



Note

Also applies to the Audi S 6 and the Audi RS 6.

Features of the refrigerant system:

Red colored restrictor.

Reservoir

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"Denso" A/C compressor with A/C Compressor Regulators of information in this document. Copyright by AUDI AG. Valve - N280- (without A/C clutch)

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A6 /S 6	From 04/2004	530 + / _ 20	Red colored restrictor
Audi RS 6	From 05/2008	500 + / _ 20	 Red colored restrictor Condenser with a smaller internal capacity

- Replacement restrictors with different holes are available: Yellow colored 1.54 mm, red colored 1.42 mm.
- Depending on manufacturer, color of red restrictor may tend more towards orange.
- So as not to change the A/C system cooling output, only red-colored restrictors may be installed.
- Different A/C compressors are installed depending on the version. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual) and to the ⇒ Electronic Parts Catalog (ETKA) .
- In contrast to vehicles with other engines, vehicles with the 10-cylinder TFSI engine (Audi RS 6) have a condenser with a smaller interior volume installed. For this reason, the refrigerant fill volume is slightly less in a 10-cylinder TFSI engine than in other engines. Refer to the ⇒ Electronic Parts Catalog (ETKA).
- 10.1.16 Capacities for Audi A6 (4G_ or 4X_ for China) from MY 2011, Audi A7 (4G_ or 4X_ for China) from MY 2011, Audi A6 Hybrid (4G_{_}) from MY 2012 and A6 e-tron (4G_) from MY 2017



Note

- Also applies to the Audi S and the Audi RS models.
- A condenser with a reduced height is installed on RS models. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

- **Expansion Valve**
- Receiver/Dryer
 - Refrigerant line with inner heat exchanger
- Mechanical "Denso" A/C compressor, with A/C Compressor Regulator Valve - N280- (and depending on engine, also with an A/C Clutch - N25- from MY 2014). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) (all vehicles except on the Audi A6 Hybrid).
- Vehicles with a high-voltage system (Audi A6 Hybrid) have electrical "Denso" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- Vehicles with a high-voltage system (Audi A6 e-tron) have electrical "Sanden" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant







Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A6	From 02/2011	570 + / _ 20	• None
Audi A7	From 10/2010	570 + / _ 20	None
Audi RS 6 / RS 7	From 01/2013	540+/_20	Condenser with smaller internal vol- ume
Audi A6 Hy-	From 11/2011	860 ⁺ / ₋ 15 (see notes)	Electrically-Driven A/C Compressor
brid	tected by copyright. Copying fo	r private or commercial purposes, in part or	With second evaporator in the battery in whooding module
ре	rmitted unless authorised by Al	JDI AG. AUDI AG does not guarantee or ac	cept any liability
	with From 09/2016 ess	of information in this document. Copyright by 1000 / - 15	♣ ^{AU} Electrically-Driven A/C Compressor
tron			With second evaporator in the high- voltage battery heat exchanger



- The type designation 4X_ is used instead of the type designation 4G_ for specific versions in China
- At the start of production, mechanically-driven "Denso" A/C compressors were installed on all vehicles except for the Audi A6 Hybrid (Audi A6 e-tron). A/C compressors from other manufacturers may also be installed at a later time. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- An electrical A/C compressor manufactured by "Denso" (Electrical A/C Compressor - V470- with A/C Compressor Control Module - J842-) is installed at the start of production on the Audi A6 Hybrid. There is no A/C Compressor Regulator Valve - N280- present in this A/C compressor.
- ◆ At the start of production, an electrical "Sanden" A/C compressor (Electrical A/C Compressor - V470- with A/C Compressor Control Module - J842-) is installed on the Audi A6 e-tron. There is no A/C Compressor Regulator Valve - N280present in this A/C compressor.
- A/C compressors with a refrigerant oil quantity of 200 ccm were installed at the start of production for Audi A6 Hybrid vehicles. A refrigerant filling capacity of 840 ± 15 g (29.6) ± 0.5 oz) was planned for these vehicles at the factory (information can be found on the information label for the refrigerant). Shortly after the start of production, the refrigerant oil quantity was reduced to 160 ccm and the refrigerant quantity was raised to 860 ± 15 g (30.3 ± 0.5 oz). Always fill this vehicle when servicing to 860 ± 15 g (30.3 ± 0.5 oz) with refrigerant, regardless of the refrigerant oil quantity (write the capacity information on the information label with a waterproof marker if necessary).
- In contrast to vehicles with other engines, the Audi S 6/RS 7 has a condenser with a smaller interior volume installed. For this reason, the refrigerant fill volume is slightly less on this model than on other vehicles in this series. Refer to the ⇒ Electronic Parts Catalog (ETKA).



Capacities for Audi V8 (4C_) through MY 1994 10.1.17

Features of the refrigerant system:

- Restrictor (not colored).
- Reservoir
- "Zexel / Valeo" A/C compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi V8	From 10/1992 to 10/1993	850 + 50	None



Note

- Replacement restrictors with different holes are available. If these vehicles are equipped with a yellow colored restrictor, add 50 g (1.8 oz) more refrigerant than specified in the table. After charging, amend capacity stated on label or affix label indicating new capacity.
- In order to distinguish between the different restrictor versions, the restrictors with a smaller hole are colored (yellow or red). The red colored restrictor is not to be installed into these vehicles.
- Depending on manufacturer, color of red restrictor may tend more towards orange.
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".

Capacities for Audi A8 (4D_) from MY 1994 10.1.18

Features of the refrigerant system:

- Restrictor
- Reservoir
- "Denso" or "Zexel / Valeo" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A8	From 05/1994 to 11/1997	750 + 50	Restrictor (not colored)
	From 11/1997	800 + 50	Restrictor colored (yellow)

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- Restrictors with a modified hole have been installed at the factory from 11/1997 (yellow colored). The capacity was increased by 50 g (1.8 oz) for vehicles with a yellow colored restrictor.
- In order to distinguish between the different restrictor versions, the restrictors with a smaller hole are yellow (1.54 mm) or red (1.42 mm) colored. The restrictor with the larger hole (1.83 mm) is not colored.
- If a vehicle is equipped with a yellow colored restrictor as replacement for a non-colored restrictor, add 50 g (1.8 oz) more refrigerant than specified in the table. In addition, the capacity specified on the label in the vehicle is to be checked and amended if necessary, or the existing label is to be replaced with one indicating the correct capacity (affix over old label). The red colored restrictor is not to be installed into these vehicles.
- Exclusive use was made at the start of production of "Zexel / Valeo" A/C compressors. From MY 1996, production was gradually switched to "Denso" A/C compressors. Refer to Heating, Ventilation and Air Conditioning; Rep. Gr. 87 Refrigerant Circuit (vehicle-specific repair manual) and to the ⇒ Electronic Parts Catalog (ETKA) .
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".

Capacities for Audi A8 (4E_) from MY 2003 10.1.19

Features of the refrigerant system:

- Red colored restrictor.
- Reservoir
- "Denso" A/C compressor with A/C Compressor Regulator Valve - N280- (without A/C clutch). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A8	From 10/2002	620 + / _ 20	Red colored restrictor



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- Depending on manufacturer, color of red restrictor may tend more towards orange.
- So as not to change the A/C system cooling output, only red-colored restrictors may be installed.
- Different A/C compressors are installed depending on the version. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and to the ⇒ Electronic Parts Catalog (ETKA).



Capacities for Audi A8 (4H_) from MY 2010 and Audi A8 Hybrid (4H_) 10.1.20 from MY 2012

Features of the refrigerant system:

- **Expansion Valve**
- Depending on the vehicle equipment level with one or two evaporators
- Refrigerant line with inner heat exchanger
- Dryer Cartridge in receiver driver on Condense rantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.
- Mechanical "Denso" A/C compressor with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) (all vehicles except Audi A8 Hybrid).
- Vehicles with a high-voltage system (Audi A8 Hybrid) have electrically-driven "Denso" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .



Caution

Capacities may vary for the refrigerant and the refrigerant oil on vehicles with an 8-cylinder TDI engine.

Due to the installed location of the A/C compressor (above the engine), the refrigerant oil capacity may vary from what is on the A/C compressor data plate on vehicles with an 8-cylinder TDI engine.

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A8 (all vehicles ex- cept for the 8- cylinder TDI engine)	From 03/2010		
♦ Vehicle with one evaporator		780 ⁺ / ₋ 20	One evaporator
♦ Vehicle with two evaporators		930 + / _ 20	Two evaporators
Audi A8 (only the 8-cylinder TDI engine)	From 03/2010		
Vehicle with one evaporator		740 ⁺ / ₋ 15	One evaporator
◆ Vehicle with two evaporators		915 ⁺ / ₋ 15	Two evaporators



Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi A8 Hy- brid	From 01/2012	1080 + / _ 15	An evaporator in the A/C unit
brid			Electrically-Driven A/C Compressor
			2. Evaporator in Battery Cooling Module

- On vehicles with an 8-cylinder TDI engine, the refrigerant oil quantity was increased in the refrigerant circuit from the vehicle identification number 4H_ BN 018846. To compensate, the refrigerant quantity must be slightly reduced. Since the filling capacity information on the information label does not change, proceed as follows: on vehicles that were built up to the specified vehicle identification number, check whether the refrigerant oil capacity was already topped up during a previous workshop visit. If not, fill the refrigerant circuit with an additional 50 ccm of refrigerant oil. Then correct the fill capacity for the refrigerant on the information label with a waterproof marker accordingly and fill the refrigerant circuit with the above specified refrigerant quantity. Then document the changes that have taken place in the vehicle data. For vehicles built from the specified VIN, check the refrigerant capacity specification on the information label and if necessary, amend the quantities with a waterproof marker accordingly and then fill the refrigerant circuit with the abovespecified refrigerant quantity.
- For all vehicles except for the Audi A8 Hybrid, the mechanically driven A/C compressors manufactured by "Denso" right. Copying for private or commercial purposes, in part or in whole, is not are installed at the start of production. A/C compressors authorised by AUDI AG. AUDI AG does not guarantee or accept applicability from other manufacturers may also be installed at a later the correctness of information in this document. Copyright by AUDI AG. time. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- An electrical A/C compressor manufactured by "Denso" (Electrical A/C Compressor - V470- with A/C Compressor Control Module - J842-) is installed at the start of production on the Audi A6 Hybrid. There is no A/C Compressor Regulator Valve - N280- present in this A/C compressor.
- A/C compressors with a refrigerant oil quantity of 200 ccm were installed at the start of production on Audi A8 Hybrid vehicles. Shortly after the start of production, the refrigerant oil quantity was reduced to 160 ccm. Always fill this vehicle when servicing to 1080 ± 15 g (0.5 oz) with refrigerant, regardless of the refrigerant oil quantity (write the capacity information on the information label with a waterproof marker if necessary).

10.1.21 Capacities for Audi Q7 (4L_) MY 2006

Audi Q7 (4L_) from MY 2006

- **Expansion Valve**
- Depending on the vehicle equipment level with one or two evaporators
- Dryer cartridge in receiver/dryer on condenser

"Denso" A/C compressor with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi Q7 (4L_)	From 02/2006		
♦ Vehicle with one evaporator		700 + 50	One evaporator
♦ Vehicle with two evaporators		1050 + 50	Two evaporators

10.1.22 Capacities for Audi Q7 (4M_) from MY 2016

The capacities for refrigerant R134a can be found in the vehicle-specific repair manual. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Technical Data; Refrigerant R1234yf Capacities.



Note

- On the Audi QZ:e-trom there are differences to the others, in part or in whole, is not vehicles additional components installed in the refrigerantee or accept any liability circuit. For the layout of the different refrigerant circuits, refer to AUDI AG to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Due to the layout, the high pressure side service connection in the refrigerant circuit is located on the Audi Q7 e-tron on the high pressure side service connection only when operating the refrigerant circuit as a high pressure heat pump. In the A/C system operation the pressure is the same as on the low pressure side service connection.
- To discharge, evacuate, and charge the refrigerant circuit on the Audi Q7 e-tron the valves installed in the refrigerant circuit which are power operated are opened. Activate and open the valves through a routine stored in the Thermal Management Control Module - J1024- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and use the ⇒ Vehicle diagnostic tester in the "Guided Fault Finding" function.

10.1.23 Capacities, Audi R8 (42_) from MY 2008, Audi R8 (4S_) from MY 2015

Characteristics of the Audi R8 (42_) refrigerant circuit from MY 2008:

- Red colored restrictor.
- Reservoir
- Two condensers switched in sequence
- "Denso" A/C compressor with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).



Characteristics of the Audi R8 (4S) refrigerant circuit from MY 2015:

- **Expansion Valve**
- Receiver/Dryer (with Dryer)
- Two condensers switched in sequence
- "Denso" A/C compressor with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Vehicle type	Production period	Capacity in grams	Differing features of this refrigerant circuit
Audi R8 (42_)	From 03/2007 to 11/2012	680 ⁺ / ₋ 20 ◆ Originally these vehicles were filled with 650 g (22.9 oz) of refrigerant, then the capacity was raised to 680 g (24 oz) (see notes).	Red colored restrictor
	From 11/2012	680 ⁺ / ₋ 20	
Audi R8	From 08/2015	820 ⁺ / ₋ 15	Expansion Valve
(4S_)			 Receiver/dryer (with dryer) as extra component



- Replacement restrictors with different holes are available: Yellow colored 1.54 mm, red colored 1.42 mm.
- Depending on manufacturer, color of red restrictor may tend more towards orange.
- So as not to change the A/C system cooling output, only Protected by red-colored restrictors may be installed and or in whole, is not
 - From the VIN 429 DN 000751 (time period of production from 11/2013) the refrigerant quantity for the refrigerant circuit was raised from 650 g to 680 g (22.9 oz to 24 oz) and with resp the refrigerant oil quantity was raised from 150 ccm to 200 ccm. The increased refrigerant and refrigerant oil capacity applies retroactively to all vehicles. On vehicles that were built up to the specified vehicle identification number, check whether the refrigerant oil capacity was already topped up during a previous workshop visit. If not, fill the refrigerant circuit with an additional 50 ccm of refrigerant oil. Finally, check the refrigerant capacity information on the information label and if necessary, attach a new information label with the correct capacity and language (for example, the identification label with the part number 420 010 535 and the index BA with the labeling in German and English). Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual). If there is no information label available with the correct capacity and language, amend the capacity information on the existing information label accordingly using a waterproof marker. Finally, increase the refrigerant oil quantity in the refrigerant circuit by 50 ccm if necessary and fill the refrigerant circuit with the above-specified refrigerant amount. Refer to Refer to ⇒ "10.2.25 Capacities, Audi R8 (42) from MY 2008, Audi R8 (4S) from MY 2015", page 402.

10.2 Approved Refrigerant Oils and Refrigerant Oil Capacities

- ⇒ "10.2.1 Approved Refrigerant Oils", page 362
- ⇒ "10.2.2 Refrigerant Oil Capacities", page 364
- ⇒ "10.2.3 Capacities for Audi A1 (8X_) from MY 2011", page <u>365</u>
- ⇒ "10.2.4 Capacities for Audi A2 (8Z_) from MY 2001", page
- ⇒ "10.2.5 Capacities for Audi A3 (8L_) from MY 1997 and Audi TT (8N_) from MY 1999", page 368
- ⇒ "10.2.6 Capacities for Audi A3 (8P_) from MY 2004 and Audi Q3 (8U_ or 84_ for China) from MY 2012", page 369
- ⇒ "10.2.7 Capacities for Audi Q2 (GA_) from MY 2017, Audi A3 (8V_ or 85_ for China) from MY 2013, Audi A3 e-tron (8V_) from MY 2015, and Audi RS 3 (8V_) from MY 2016", page 370
- ⇒ "10.2.8 Capacities for Audi TT (8J_) from MY 2007", page **374**
- ⇒ "10.2.9 Capacities for Audi TT (FV_) from MY 2015", page
- ⇒ "10.2.10 Capacities for Audi 80 (8A_/8C_), Audi Coupe (8B_) and Audi Cabriolet (8G_) through MY 2002", page 376
- ⇒ "10.2.11 Capacities for Audi A4 (8D_) from MY 1995", page 377
- ⇒ "10.2.12 Capacities for A4 (8E_) from MY 2001 and Audi A4 Cabriolet (8H_) from MY 2003", page 378
- ⇒ "10.2.13 Capacities for Audi A4 (8K_) from MY 2008, Audi yright. Copying for private or commercial purposes, in part or in whole, is not A5 Coupe and Sportback (8T_) from MY 2008, Audi Q5 (8Rs or or or or or or or or guarantee or accept any liability 83_ for China) from MY 2008, Audi A5 Cabriolet (8F/it) from MY correctness of information in this document. Copyright by AUDI AG. 2009, and Audi Q5 Hybrid (8R_) from MY 2011", page 379
- ⇒ "10.2.14 Capacities for Audi A4 (8W_) from MY 2016, Audi A4 (86_ for China) from MY 2017, Audi A5 (F5_) from MY 2016, Audi Q5 (FY_) from MY 2017, Audi Q5 (87_ for China) from MY <u>2019", page 386</u>
- ⇒ "10.2.15 Capacities for Audi 100 / Audi A6 (4A_) through MY 1998", page 387
- ⇒ "10.2.16 Capacities for Audi A6 (4B_) from MY 1998 and Audi allroad through MY 2005", page 388
- ⇒ "10.2.17 Capacities for Audi A6 (4F_) from MY 2005", page 390
- ⇒ "10.2.18 Capacities for Audi A6 (4G_ or 4X_ for China) from MY 2011, Audi A7 (4G_ or 4X_ for China) from MY 2011, Audi



- A6 Hybrid (4G_) from MY 2012 and A6 e-tron (4G_) from MY 2017", page 391
- ⇒ "10.2.19 Capacities for Audi V8 (4C_) through MY 1994", page 394
- ⇒ "10.2.20 Capacities for Audi A8 (4D_) from MY 1994", page 394
- ⇒ "10.2.21 Capacities for Audi A8 (4E_) from MY 2003", page 395
- ⇒ "10.2.22 Capacities for Audi A8 (4H_) from 2010 and Audi A8 Hybrid (4H_) from 2012", page 396
- ⇒ "10.2.23 Capacities for Audi Q7 (4L_), from MY 2006", page **400**
- ⇒ "10.2.24 Capacities for Audi Q7 (4M_) from MY 2016", page
- \Rightarrow "10.2.25 Capacities, Audi R8 (42_) from MY 2008, Audi R8 (4S_) from MY 2015", page 402
- From Audi A8 (4N) from MY 2018, the information for the approved refrigerant oil and the capacity for the refrigerant oil can be found in the vehicle-specific repair manual Refer pyright. Copying for private or commercial purposes, in part or in whole, is not to \Rightarrow Heating, Ventilation and Air Conditioning; Repringed unto a sutherised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG. Technical Data .
- Approved Refrigerant Oils. Refer to ⇒ "10.2.1 Approved Refrigerant Oils", page 362.
- Refrigerant oil capacities. Refer to ⇒ "10.2.2 Refrigerant Oil <u>Capacities", page 364</u>



10.2.1 Approved Refrigerant Oils



- The oils used with refrigerant R12 are not suitable for refrigerant R134a.
- The name of the compressor manufacturer "Nippondenso" has been changed to "Denso".
- The special refrigerant oils and oils that are only for refrigerant circuits with refrigerant R134a are not always available on the open market.
- Refrigerant oils specifically designed for each compressor can therefore be obtained from the replacement parts program. Refer to the ⇒ Electronic Parts Catalog (ETKA).
- If a faulty A/C compressor is replaced with an A/C compressor from another manufacturer, check if the same refrigerant oil is approved for the A/C compressor to be installed as the one that is already in the refrigerant circuit (from the removed A/C compressor). If a different refrigerant oil is approved for the A/C compressor to be installed than the one in the removed A/C compressor, the refrigerant circuit must be flushed. Refer to Refer to ⇒ "5.5 Refrigerant Circuit," Cleaning (Flushing) with Refrigerant R134a" page 93.
- A87-11299
- The use of other refrigerant oils could cause All the management of guarantee or accept any liability as they do not always mix and thus circulate with refrigerant. R134a (for compressor lubrication).
- The "Zexel / Valeo", "Denso", "Delphi/Mahle" and "Sanden" A/C compressors all have different refrigerant oils. Refer to the ⇒ Electronic Parts Catalog (ETKA).
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".
- The refrigerant oil with the part number G 052 300 A2 (external designation ND 8) to be used in refrigerant circuits with a "Denso" A/C compressor (old manufacturing name "Nippondenso") is also included in the retrofit kit (part number 4A0 298 107 A). It is the same for mechanically and electrically driven A/Ć compressors. Refer to the ⇒ Électronic Parts Catalog (ETKA) .
- For refrigerant circuits with "Zexel/Valeo" compressors use is to be made of refrigerant oil with part number G 052 154 A2. Refer to the ⇒ Electronic Parts Catalog (ETKA)
- For refrigerant circuits with mechanically-driven "Sanden" A/C compressors, the refrigerant oil with part number G 052 154 A2 (or the part number G 052 535 M2) is to be used. Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- For mechanically-driven "Sanden" A/C compressors, the refrigerant oil with part number G 052 535 M2 (external designation SP A2) can also be used in addition to the refrigerant oil with part number G 052 154 A2 (external designation SP 10). Refer to the ⇒ Electronic Parts Catalog (ETKA).
- For refrigerant circuits with electrically-driven "Visteon" or "Sanden" A/C compressors (for example in the A3 e-tron and in the Audi Q7 e-tron), use the refrigerant oil with part number G 052 535 M2. Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- Refrigerant oils with part numbers G 052 154 A2 and G 052 300 A2 can be used in refrigerant circuits with a "Del-



- phi/Mahle" A/C compressor. Refer to the ⇒ Electronic Parts , Catalog (ETKA) .
- For refrigerant circuits with an "Zexel / Valeo" A/C compressor, both the refrigerant oil (G 052 154 A2) and the refrigerant oil (G 052 200 A2) contained in the retrofit kit (part number 4A0 298 107) may be used. Refer to the ⇒ Electronic Parts Catalog (ÉTKA) .
- Currently the electrically-driven A/C compressor (for example, on the Audi Q5 Hybrid manufactured by "Denso") is filled with the same refrigerant oil as the manufacturer mechanically-driven A/C compressor (refer to the type plate on the A/C compressor). Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- Since different refrigerant oils are used depending on the A/C compressor manufacturer, a certain small amount (up to maximum 10%) of refrigerant oil may be released in the respective vehicle refrigerant circuit with a different specification as the respective A/C compressor installed. This is so that the A/C service station does not have to be cleaned after every procedure on different vehicles. Therefore for Audi, up to a maximum of 10% SP 10 (or SP A2) refrigerant oil may be filled on a vehicle with a "Denso" A/C compressor (with ND 8 refrigerant oil), or up to a maximum of 10% ND 8 refrigerant oil may be filled on a vehicle with a "Sanden", "Delphi/Mahle" or "Visteon" A/C compressor (with SP 10 or SP A2 refrigerant oil). However, other refrigerant oils that are not specified here may not be filled (different properties due to different viscosity, other or missing additives, etc.).
- Instead of discharging via the A/C service station, the extracted refrigerant oil can either be filled when emptying the refrigerant circuit via an open connection before evacuating the refrigerant circuit, or with valve -3- removed via a service connection -1- or -2- using a commercially available syringe. Refer to Refer to > "3.5 Quick-Release Coupling Connetions on Refrigerant Circuit", page 43. This is useful for example when a refrigerant oil is specified for a refrigerant. Copying for private or commercial purposes, in part or in whole, is not circuit, that is normally only seldom used. Always fill with horised by AUDI AG. AUDI AG does not guarantee or accept any liability *"2.6 Refrigerant*: *⊙il*"e correctness of information in this document. Copyright by AUDI AG. fresh coolant oil. Refer to Refer to ≥ <u>page 12</u> and the ⇒ Electronic Parts Catalog (ETKA) . The arrangement of the service connection -1- or -2- in the vehicle varies. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual).

Important information:

Refrigerant oil attracts moisture. Close any opened containers immediately after use to prevent moisture from entering.



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10.2.2 Refrigerant Oil Capacities



- The allocation of the A/C compressor ("Zexel / Valeo", "Sanden" or "Denso") can be found in the vehicle-specific repair manual. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).
- Beginning from production year 2006, the name of the if Zex in whole, is not el" A/C compressor was changed from Zexel to day ale of accept any lial el" A/C compressor was changed from Zexel to del compressor was changed from the content of the con
- With "Zexel", "Denso" and "Sanden" compressors, the amount of refrigerant oil in the replacement compressor corresponds to the total quantity of oil to be added. On A/C compressor replacement, the quantity of refrigerant oil in the A/C compressor to be installed must therefore be adjusted (an incorrect refrigerant oil quantity will damage the A/C compressor).
- When pouring refrigerant oil out of replacement A/C compressor (or malfunctioning A/C compressor), a small quantity of oil generally remains in the mechanically driven A/C compressor (20 to 30 cm³). This amount of refrigerant oil does not affect the function of the air conditioner and can therefore be ignored (always remains in A/C compressor). On electrically-driven A/C compressors depending on the construction and version a large about of refrigerant oil remains in the A/C compressor when pouring out, so instead of emptying these are flushed. Refer to Refer to ⇒ "5.5.2 Electrical-<u> İy-Driven A/C Compressor, Flushing (Removing Refrigerant</u> Oil)", page 113
- Following initial switch-on, the refrigerant oil is distributed throughout the entire refrigerant circuit.
- The specified capacities for the refrigerant oil apply if no other different specifications given for the "S" and "RS".
- Refrigerant oil capacities when replacing refrigerant circuit components. Refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacing", page 299 . Also refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Ĉatalog (ĖTKA) .
- Refer to ⇒ "10.2.3 Capacities for Audi A1 (8X) from MY 2011", page 365
- Refer to ⇒ "10.2.4 Capacities for Audi A2 (8Z) from MY <u>2001", page 368</u>
- Refer to ⇒ "10.2.5 Capacities for Audi A3 (8L_) from MY 1997 and Audi TT (8N_) from MY 1999", page 368
- Refer to \Rightarrow "10.2.6 Capacities for Audi A3 (8P_) from MY 2004 and Audi Q3 (8U_ or 84_ for China) from MY 2012", page 369
- Refer to ⇒ "10.2.7 Capacities for Audi Q2 (GA_) from MY 2017, Audi A3 (8V or 85 for China) from MY 2013, Audi <u>.3 e-tron (8V_) from MY 2015, and Audi RS 3 (8V_) from</u> <u>MY 2016", page 370</u>
- Refer to ⇒ "10.2.8 Capacities for Audi TT (8J) from MY <u>2007", page 3</u>74
- Refer to ⇒ "10.2.9 Capacities for Audi TT (FV_) from MY <u>2015", page 375</u>



- Refer to \Rightarrow "10.2.10 Capacities for Audi 80 (8A /8C), Audi Coupe (8B_) and Audi Cabriolet (8G_) through MY 2002", page 376
- Refer to ⇒ "10.2.11 Capacities for Audi A4 (8D_) from MY <u>1995", page 377</u>
- Refer to ⇒ "10.2.12 Capacities for A4 (8E_) from MY 2001 and Audi A4 Cabriolet (8H_) from MY 2003", page 378
- Refer to ⇒ "10.2.13 Capacities for Audi A4 (8K_) from MY 2008, Audi A5 Coupe and Sportback (8T) from MY 2008, Audi Q5 (8R or 83 for China) from MY 2008, Audi A5 Cabriolet (8F) from MY 2009, and Audi Q5 Hybrid (8R) from MY 2011", page 379
- Refer to ⇒ "10.2.14 Capacities for Audi A4 (8W_) from MY 2016, Audi A4 (86 for China) from MY 2017, Audi A5 (F5 from MY 2016, Audi Q5 (FY_) from MY 2017, Audi Q5 (87_ for China) from MY 2019", page 386
- Refer to ⇒ "10.2.15 Capacities for Audi 100 / Audi A6 (4A) through MY 1998", page 387
- Refer to \Rightarrow "10.2.16 Capacities for Audi A6 (4B_) from MY 1998 and Audi allroad through MY 2005", page 388
- Refer to = "10.2.17 Capacities for Audi A6 (4F) from MY 2005", page 390
- Refer to ⇒ "10.2.18 Capacities for Audi A6 (4G_or 4X_for China) from MY 2011, Audi A7 (4G or 4X for China) from MY 2011, Audi A6 Hybrid (4G_) from MY 2012 and A6 e-tron (4G_) from MY 2017", page 391
- Refer to = "10.2.19 Capacities for Audi V8 (4C_) through MY <u>1994", page 394</u>
- Refer to ⇒ "10.2.20 Capacities for Audi A8 (4D_) from MY 1994", page 394
- Prote ned Referritor ≥ 0°10 2 221 Capacities for Audin A8 (4 Ew) from MY permitted 2003" aupage 395 DI AG. AUDI AG does not guarantee or accept any liability f information in this document. Copyright by AUDI AG.
 - Refer to ⇒ "10.2.22 Capacities for Audi A8 (4H_) from 2010 and Audi A8 Hybrid (4H_) from 2012", page 396
 - Refer to ⇒ "10.2.23 Capacities for Audi Q7 (4L_), from MY <u>2006", page 400</u>
 - Refer to ⇒ "10.2.24 Capacities for Audi Q7 (4M_) from MY <u>2016", page 402</u>
 - Refer to ⇒ "10.2.25 Capacities, Audi R8 (42_) from MY 2008, Audi R8 (4S_) from MY 2015", page 402

10.2.3 Capacities for Audi A1 (8X_) from MY 2011

- **Expansion Valve**
- Receiver/Dryer
- A/C compressor by various manufacturers with A/C Compressor Regulator Valve - N280- (without A/C clutch). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Vehicle type	Production period	Total quantity of oil in re- frigerant circuit in cm ³	Quantity of refrigerant oil in replacement compressor in cm ³	Differing features of this refrigerant circuit
Audi A1	From 08/2010	110 ⁺ / ₋ 10	110 ⁺ / ₋ 10	"Sanden" (or "Del- phi/Mahle") A/C com- pressor, part number "5N0 xxx xxx"
		90 + / _ 10	90 + / _ 10	"Denso" A/C compressor, part number "1K0 xxx xxx"
		110+ / _ 10	110 + / _ 10	"Denso" A/C compressor, part number "5Q0 xxx xxx" (pay attention to the notes)
		75 ⁺ / ₋ 10	75 ⁺ / ₋ 10	"Sanden" A/C compressor, part number "5K0 xxx xxx"
	From 07/2012	75 ⁺ / ₋ 10	75 ⁺ / ₋ 10	"Sanden" A/C compres- sor, "5Q0 xxx xxx"
		110 + / _ 10	110 + / _ 10	"Delphi/Mahle" A/C compressor, part number "5K0 xxx xxx" or "5Q0 xxx xxx"



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- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to 놀 Components, Replacing", page 299
- Different A/C compressors are installed depending on production period and engine.
- At the start of production, A/C compressors manufactured by "Denso" type "6 SEU 14C" or "Sanden" type "7 PXE 16/14" were installed. Refer to the ⇒ Electronic Parts Catalog (ET-KA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Depending on the engine, A/C compressors from manufacturers "Sanden" type" "11 PXC 14" or "Delphi/Mahle" type "6 CVC 140" may also be installed at a later time (introduction TBD, planned from 09/2012). Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- Depending on the engine, a different version of "Denso" or "Sanden" A/C compressors may be installed at a later date (introduction not yet finalized). Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- These A/C compressors are available as replacement parts with different oil capacities, therefore note the oil capacity in the A/C compressor and the exact part number. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- The reason for the different oil capacities inside the A/C compressor is due to the design of the A/C compressor (with or without an oil separator on the high pressure connection) or to the design of the refrigerant circuit if the A/C compressors are have the identical design. Pay attention to the different capacities. Too much oil in the circuit leads to higher pressures and reduces cooling output of the system. Too little oil may lead to lubrication problems in the compressor.
- A data plate may be attached to the A/C compressor by the manufacturer, indicating the part number and refrigerant oil quantity.
- From 11/2012, the refrigerant oil quantity for the "Denso" A/C compressor with the part number "5Q0 xxx xxx" was gradually increased from 80 ccm to 110 ccm. The increased refrigerant oil capacity applies retroactively to all vehicles with this A/C compressor. On vehicles that were built through 11/2012 with this A/C compressor, check whether the refrigerant oil capacity was already topped up during a previous workshop visit. If not, fill the refrigerant circuit with an additional 30 ccm of refrigerant oil. Then note the refrigerant oil capacity with a waterproof marker on the sticker and fill the refrigerant circuit with the above-specified refrigerant quantity. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview -A/C System (vehicle-specific repair manual). Refer to Refer to ⇒ "10.1.1 Capacities for Audi A1 (8X) from MY 2011", page 319 .

10.2.4 Capacities for Audi A2 (8Z_) from MY 2001

Features of the refrigerant system:

- Restrictor
- Reservoir
- A/C compressor with A/C Compressor Regulator Valve -N280- (without A/C clutch).
- "Denso" A/C compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ĖTKA).

Vehicle type	Production period	Total quantity of oil in refrigerant circuit in cm ³	Quantity of refrigerant oil in replace- ment compressor in cm ³
Audi A2	From 06/2000	180 ⁺ / -15	180 ⁺ / -15



Note

- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacing", page 299
- Since the A/C compressor is continuously running with the engine and the entire quantity of refrigerant oil is contained in the A/C compressor, the circuit must be completely assembled before starting the engine. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual)
- This A/C compressor is available as a replacement part with different oil capacities, therefore note the exact part number need purposes, in part or in whole, is not Refer to the ⇒ Electronic Parts Catalog (ETKA), AUDI AG. AUDI AG does not guarantee or accept any liability s of information in this document. Copyright by AUDI AG.

10.2.5 Capacities for Audi A3 (8L_) from MY 1997 and Audi TT (8N_) from MY 1999

- **Expansion Valve**
- Receiver/Dryer
- "Sanden" or "Zexel / Valeo" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Vehicle type	Production period	Total quantity of oil in refrigerant circuit in cm ³	Quantity of refrigerant oil in replace- ment compressor in cm ³
Audi A3	From 08/1996	135 +/ -15	135+/-15
Audi TT	From 10/1998	135 +/ -15	135+/-15





- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacing", page
- Exclusive use was made at the start of production of "Sanden" A/C compressors. A/C compressors manufactured by "Zexel / Valeo" were also used from MY 1999. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".

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Capacities for Audi A3 (8P_) from MY 2004 and Audi Q3 (8U_ or 84_ for China) from MY 2012



Note

- The filling capacities provided in the following table apply for the Audi A3, the Audi A3 Sportback, the Audi RS 3, the Audi A3 Cabriolet and the Audi Q3 (and Audi RS Q3).
- Certain versions for China use the designation 84_ rather than 8U_.

- **Expansion Valve**
- Receiver/Dryer
- A/C compressor by various manufacturers with A/C Compressor Regulator Valve - N280- (without A/C clutch). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Vehicle type	Production period	Total quantity of oil in re- frigerant circuit in cm ³	Quantity of refrigerant oil in replacement compressor in cm ³	Differing features of this refrigerant circuit
Audi A3 Audi Q3	From 05/2003 to 10/2003	180 + / _ 10	180 + / _ 10	"Denso" A/C compressor "7 SEU 16"
	From 10/2003	120 + / - 10	120 + / - 10	"Zexel" A/C compressor
		110 + / _ 10	110 ⁺ / ₋ 10	"Sanden" A/C compressor, except part number "5K0 xxx xxx"
		140 + / _ 10	140 + / _ 10	"Denso" A/C compressor "7 SEU 17"
	From 06/2007	90 + / _ 10	90 + / _ 10	"Denso" A/C compres- sor "6 SEU 14"

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Vehicle type	Production period	Total quantity of oil in re- frigerant circuit in cm ³	Quantity of refrigerant oil in replacement compressor in cm ³	Differing features of this refrigerant circuit
	From 08/2007	110 + / _ 10	110 + / _ 10	"Delphi/Mahle" A/C compressor
	From 06/2013	75 ⁺ / ₋ 10	75 ⁺ / ₋ 10	"Sanden" A/C compressor, part number "5K0 xxx xxx"

Note

- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacing", page 299.
- Different A/C compressors are installed depending on production period and engine.
- At the start of production, exclusive use was made of A/C compressors "7 SEU 16" from "Denso" (for example, A/C compressor with part no. 1K0 820 803 up to index "D"). In MY 2004 (from approximately 10/2003), a gradual change was made to a different type of "Denso" A/C compressor (SEU 17" for example, A/C compressor with part number 1K0 820 803 from index "E").
- From MY 2004 (from approximately 10/2003) as a running change "Zexel / Valeo" (type "DSC17E") and "Sanden" ("PXE16") A/C compressors are also installed depending on the engine. Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".
- Depending on the engine, A/C compressors manufactured by "Denso" ("6 SEU 14") and "Delphi/Mahle" are also gradually being installed from MY 2008. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- This A/C compressor is available as a replacement part with different oil capacities, therefore note the oil capacity in the A/C compressor and the exact part number. Refer to the ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- The reason for the different oil capacities inside the A/C compressor is due to the design of the A/C compressor (with or without an oil separator on the high pressure connection) or to the design of the refrigerant circuit if the A/C compressors are have the identical design. Pay attention to the different capacities. Too much oil in the circuit leads to higher or in whole, is not pressures and reduces cooling output of the system. Too to accept any liability little oil may lead to lubrication problems in the compressor.
- A data plate may be attached to the A/C compressor by the manufacturer, indicating the part number and refrigerant oil quantity.

10.2.7 Capacities for Audi Q2 (GA_) from MY 2017, Audi A3 (8V_ or 85_ for China)



from MY 2013, Audi A3 e-tron (8V_) from MY 2015, and Audi RS 3 (8V_) from MY 2016



Note

The capacities for the Audi A3 (8V_ or 85_ for china) apply to all versions (Sedan, Sportback, Cabriolet, etc.)

Features of the refrigerant system:

- **Expansion Valve**
- Receiver/Dryer
- Mechanically driven "Denso" or "Sanden" A/C compressor with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) (all vehicles except Audi A3 e-tron).
- For vehicles with a high-voltage system (Audi A3 e-tron), with an electrically-driven "Sanden" or "Visteon" A/C compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).



Note

Depending on the date of manufacture and the engine, different mechanically-driven A/C compressors are installed (these A/C compressors do not have an A/C clutch). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Čircuit (vehicle-specific repair manual).

Vehicle type	Production period	Total quantity of oil in re- frigerant circuit in cm ³	Quantity of refrigerant oil in replacement compressor in cm ³	Differing features of this refrigerant circuit
Audi Q2 Audi A3	From 07/2016 From 05/2012	110 ⁺ / ₋ 10 Protected permitted with re	by copyright Gaying for private or communications authorised by AUD AG. AUDI AC spect to the correctness of information in	nercial Denso In A/Cocompres of a does not guarantee or accept any liabilit this document. Copylight by AUDI AG.
		75 ⁺ / ₋ 10	75 + / _ 10	"Sanden" A/C compressor
		110 + / - 10	110 + / - 10	"Delphi/Mahle" A/C compressor
Audi A3 e-tron	From 09/2014	120 + / _ 10	120 + / _ 10	Electrically-Driven A/C Compressor
				With second evapora- tor in the high-voltage battery heat exchang- er
				Varying refrigerant oil

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Vehicle type	Production period	Total quantity of oil in re- frigerant circuit in cm ³	Quantity of refrigerant oil in replacement compressor in cm ³	Differing features of this refrigerant circuit
Audi RS 3 • With 5-cyl- inder en- gine	From 02/2015	110 + / _ 10	110 ⁺ / ₋ 10	"Sanden" A/C compressor with dual belt pulley and a condenser installed in another version. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehiclespecific repair manual).



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- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacing", page 299
- Different A/C compressors are installed depending on production period and engine.
- This A/C compressor is available as a replacement part with different oil capacities, therefore note the oil capacity in the A/C compressor and the exact part number. Refer to the ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87, Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).
- The reason for the different oil capacities inside the A/C compressor is due to the design of the A/C compressor or to the design of the refrigerant circuit if the A/C compressors are have the identical design. Pay attention to the different capacities. Too much oil in the circuit leads to higher pressures and reduces cooling output of the system. Too little oil may lead to lubrication problems in the compressor.
- A data plate may be attached to the A/C compressor by the manufacturer, indicating the part number and refrigerant oil quantity.
- From 11/2012 the refrigerant oil quantity for the A/C compressor manufacturer "Denso" was gradually increased from 80 ccm to 110 ccm. The increased refrigerant oil capacity applies retroactively to all vehicles with this manufacturer's A/C compressor. On vehicles that were built through 06/2013, check whether the refrigerant oil capacity was already topped up during a previous workshop visit. If not, fill the refrigerant circuit with an additional 30 ccm of refrigerant oil. Then note the refrigerant oil capacity with a waterproof marker on the information label and fill the refrigerant circuit with the refrigerant quantity specified above. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 Refrigerant Circuit (vehicle-specific repair manual). Refer to ⇒ "10.1.5 Capacities for Audi Q2 (GA_) from MY 2017, Audi A3 (8V or 85 for China) from MY 2013, Audi A3 e-tron (8V_) from MY 2015, and Audi RS 3 (8V_) from MY 2016",
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- than on vehicles with mechanically driven A/C compressors ctness of information in this document. Copyright by AUDI AG. (for example the refrigerant oil with the part number G 052 535 M2). Refer to the ⇒ Electronic Parts Catalog (ETKA). Because this refrigerant oil is not in the reservoir of most A/C service stations, after emptying the refrigerant circuit the removed refrigerant oil cannot be refilled via the A/C service station. Refrigerant oil on this vehicle can either be filled via an open connection before evacuating the refrigerant circuit, or with the valve removed via a service connection. Refer to <u> "10.2.1 Approved Refrigerant Oils", page 362</u> . Refer to ⇒
- For refrigerant circuits with electrically driven "Visteon" or "Sanden" A/C compressors (for example in the A3 e-tron), use the refrigerant oil with part number G 052 535 M2. Refer to the ⇒ Electronic Parts Catalog (ETKA).



Capacities for Audi TT (8J_) from MY 2007 10.2.8

Features of the refrigerant system:

- **Expansion Valve**
- Receiver/Dryer
- A/C compressor by various manufacturers with A/C Compressor Regulator Valve N280- (without A/C clutch). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Vehicle type	Production period	Total quantity of oil in re- frigerant circuit in cm ³	Quantity of refrigerant oil in replacement compressor in cm ³	Differing features of this refrigerant circuit
Audi TT	From 08/2006	90 + / _ 10	90 + / _ 10	"Denso" A/C compres- sor "6 SEU 14"
		110 + / _ 10	110 + / _ 10	"Sanden" A/C compressor
		110 + / - 10	110 + / - 10	"Delphi/Mahle" A/C compressor



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- The replacement A/C compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant" Circuit Components, Replacing", page 299.
- At the start of production, "Denso" A/C compressors "6 SEU 14" were installed; these A/C compressor do not have an A/C clutch (driven by the engine). A/C compressors from other manufacturers may also be installed at a later time, depending on the engine. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- From MY 2008, "Sanden" A/C compressors (type "PXE16") are also installed as a running change on certain engines; they do not have an A/C clutch (it is driven continuously by the engine). Refer to the ⇒ Electronic Parts Catalog (ET-KA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- With a gradual introduction starting from MY 2011 and depending on the engine, "Delphi/Mahle" A/C compressors are also installed. Refer to the > Electronic Parts Catalog (ET-KA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- This A/C compressor is available as a replacement part with different oil capacities, therefore note the oil capacity in the A/C compressor and the exact part number. Refer to the Heating, Ventilation and Air Conditioning; Rep. Gr. 87 or commercial purposes, in part or in whole, is not Refrigerant Circuit (vehicle-specific repair manual) and the UDI AG does not guarantee or accept any liability ⇒ Electronic Parts Catalog (ETKA) spect to the correctness of information in this document. Copyright by AUDI AG.
- The reason for the different oil capacities inside the A/C compressor is due to the design of the A/C compressor (with or without an oil separator on the high pressure connection) or to the design of the refrigerant circuit if the A/C compressors are have the identical design. Pay attention to the different capacities. Too much oil in the circuit leads to higher pressures and reduces cooling output of the system. Too little oil may lead to lubrication problems in the compressor.
- A data plate may be attached to the A/C compressor by the manufacturer, indicating the part number and refrigerant oil quantity.

10.2.9 Capacities for Audi TT (FV_) from MY 2015

- **Expansion Valve**
- Receiver/Dryer
- Mechanically driven "Denso" or "Sanden" A/C compressor with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .



Depending on the date of manufacture and the engine, different mechanically-driven A/C compressors are installed (these A/C compressors do not have an A/C clutch). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).

Vehicle type	Production period	Total quantity of oil in re- frigerant circuit in cm ³	Quantity of refrigerant oil in replacement compressor in cm ³	Differing features of this refrigerant circuit
Audi TT	From 10/2014	110 + / _ 10	110 + / _ 10	"Denso" A/C compressor
		75 ⁺ / ₋ 10	75 ⁺ / ₋ 10	"Sanden" A/C com- pressor
		110 + / _ 10	110 + / _ 10	"Delphi/Mahle" A/C compressor
TT RS • With 5-cyl- inder en- gine	From 07/2016	110 + / _ 10	110 + / _ 10	"Denso" A/C compressor

Note

- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ≥
- Different A/C compressors are installed depending on production period and engine.
- This A/C compressor is available as a replacement part with different oil capacities, therefore note the oil capacity in the A/C compressor and the exact part number. Refer to the ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- The reason for the different oil capacities inside the A/C compressor is due to the design of the A/C compressor or to the design of the refrigerant circuit if the A/C compressors are have the identical design. Pay attention to the different capacities. Too much oil in the circuit leads to higher pressures and reduces cooling output of the system. Too little oil may lead to lubrication problems in the compressor.
- A data plate may be attached to the A/C compressor by the manufacturer, indicating the part number and refrigerant oil authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

Capacities for Audi 80 (8A_/8C_), Audi Coupe (8B_) and Audi Cabriolet 10.2.10 (8G_) through MY 2002

- Restrictor (not colored).
- Reservoir
- "Zexel / Valeo" A/C compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ÈTKA) .

Vehicle type	Production period	Total quantity of oil in refrigerant circuit in cm ³	Quantity of refrigerant oil in replace- ment compressor in cm ³
Audi 80 Audi Coupe Audi Cabrio- let	From 10/1992	250 + 50	250 + 50



- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacina", page 299
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".

10.2.11 Capacities for Audi A4 (8D_) from MY 1995

Features of the refrigerant system:

- Restrictor
- Reservoir
- "Denso" or "Zexel / Valeo" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .

Vehicle type	Production period	Total quantity of oil in refrig- erant circuit in cm ³	Quantity of refrigerant oil in replace- ment compressor in cm ³
Audi A4	From 11/1994	250 + 50	250 + 50

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- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacing", page 299.
- The Audi A4 has different A/C compressors installed depending on the engine and the time of production. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".

Capacities for A4 (8E_) from MY 2001 and Audi A4 Cabriolet (8H_) from 10.2.12

Features of the refrigerant system:

- Restrictor
- Reservoir
- "Denso" A/C compressor with A/C Compressor Regulator Valve N280- (without A/C clutch). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .

Vehicle type	Production period		Quantity of refrigerant oil in replacement compressor in cm ³	Differing features of this refrigerant circuit
Audi A4 Audi RS 4	From 11/2000 to 01/2004 • All	180 ⁺ / ₋ 10	180 ⁺ / ₋ 10	 A/C compressor type "6 SEU 12" "6 SEU 14" "7 SEU 16" or "7 SEU 17" (see notes below)
	From 01/2004 • All except 8-cylinder engine	120 ⁺ / ₋ 10	120 + / _ 10	Compressor type "6 SEU 14" or "7 SEU 17" (see notes below)
	From 01/2004 • Only 8- cylinder engine	130 ⁺ / ₋ 10	130 + / _ 10	A/C compressor type "7 SEU 17"(see notes below)



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- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacina", page
- The Audi A4 is equipped with different A/C compressors depending on engine and production period. This A/C compressor is available as a replacement part with different oil capacities, therefore note the exact part number. Refer to the ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- At the start of production, the compressor types in the first line of the table were supplied with a refrigerant oil quantity of 180 cm³. These A/C compressors can be recognized by the part number index (8E0 260 805 with one index or with double index up to "AH"), In model year, 2004 (as of approxies not guarantee or accept any liability mately 01/2004), a gradual change was made to other types ocument. Copyright by AUDI AG. of compressors with a refrigerant oil quantity of 120 cm³ or 130 cm³. These compressors can be recognized from the index of the part number 8E0 260 805 (with a double index as of "AJ") or 4F0 260 805 (and the index "E" for vehicles with 8-cylinder engine). Refer to the ⇒ Electronic Parts Catalog (ETKA).

- The reason for the different oil capacities inside the A/C compressor is due to the design of the A/C compressor (with or without an oil separator on the high pressure connection) or to the design of the refrigerant circuit if the A/C compressors are have the identical design. Pay attention to the different capacities. Too much oil in the circuit leads to higher pressures and reduces cooling output of the system. Too little oil may lead to lubrication problems in the compressor.
- A data plate may be attached to the A/C compressor by the manufacturer, indicating the part number and refrigerant oil quantity.
- 10.2.13 Capacities for Audi A4 (8K_) from MY 2008, Audi A5 Coupe and Sportback (8T) from MY 2008, Audi Q5 (8R) or 83_ for China) from MY 2008, Audi A5 Cabriolet (8F_) from MY 2009, and Audi Q5 Hybrid (8R) from MY 2011



Note

- Also applies to the Audi RS 4, Audi S 5, Audi SQ5 and Audi RS 5.
- Different capacities, depending on the version and the vehicle date of manufacture (see the following tables).
- Certain versions of the Audi Q5 for China use the designation 83_ rather than 8R_.

- **Expansion Valve**
- Receiver/Dryer
- Refrigerant pipe with inner heat exchanger.
- Mechanically driven "Denso" A/C compressor with A/C Compressor Regulator Valve - N280- (and depending on the engine and date of manufacture, also with a A/C Clutch -N25-). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the > Electronic Parts Catalog (ETKA) (all vehicles except on the Audi Q5 Hybrid).
- Vehicles with a high-voltage system (Audi Q5 Hybrid) have electrically-driven "Denso" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not ⇒ Electronic Parts Catalog (ETKA) .



- Capacities for Audi A4, Audi A5 and Audi A5 Cabriolet. Refer to \Rightarrow page 380.
- Capacities for Audi Q5 and Audi Q5 Hybrid. Refer to ⇒ page
- Capacities for Audi RS 4 and Audi RS 5. Refer to ⇒ page
- General Information for the refrigerant oil capacity and for the refrigerant circuit. Refer to ⇒ page 386.

Audi A4, Audi A5 and Audi A5 Cabriolet



- Also applies to the Audi S 5.
- Capacity for the Audi RS 5 Cabriolet. Refer to <u>⇒ page 384</u>.

Ve- hicle type	Produc- tion peri- od	Total quantity of oil in refrig- erant circuit in cm ³	Quantity of re- frigerant oil in replacement compressor in cm ³	Differing fea- tures of this refrigerant cir- cuit
Audi A4 Audi A5 (Co upe, Cab rio- let and Spo rtba ck)	◆ Audi A4, from 10/200 throug 03/201 ◆ Audi A Coupe and Sport back from 05/200 throug 03/201 ◆ Audi A Cabric let from 03/200 throug 03/201)7 h 2 .5 e -)7 h 2 5 -	150 + / _ 10	• "Denso" A/C compressor from type "6 SEU 14" and "7 SEU 17" (A/C compressor with the part number 8K0 xxx xxx)

Ve- hicle type	Produc- tion peri- od	Total quantity of oil in refrig- erant circuit in cm ³	Quantity of re- frigerant oil in replacement compressor in cm ³	Differing fea- tures of this refrigerant cir- cuit
	Audi A from 08/201 throug 03/201 (with: specif engine see notes	11 h 2 a c	110 + / _ 10	"Denso" A/C compressor from type "6 SAS 14" and with solenoid coupling (compressor with the part number 8T0 xxx xxx)
	◆ All veh cles from 03/201 (see notes		110 + / _ 10	"Denso" A/C compressor type "6 SES 14" without A/C clutch or type "6 SAS 14" with solenoid coupling (A/C compressor with the part number 8T0 xxx xxx)

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- Starting from the production date in 03/2012, 8-cylinder engines will no longer be available for the Audi A4 and Audi A5 (excluding the RS models).
- From 03/2012, the refrigerant circuit (A/C compressor, condenser, evaporator etc.) was gradually changed depending on the engine. This resulted in a different capacity for the refrigerant (identifiable by the information label for the refrigerant circuit) and the refrigerant oil for these vehicles. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- A/C compressors with an installed A/C Clutch N26- are being gradually introduced for specific 4-cylinder TDI engines starting from 08/2011. Refer to ⇒ Electronic Parts Catalog (ETKA) .
- The changed components (A/C compressor, condenser) can only be differentiated by the part number on the outside (data plate on the A/C compressor, data plate or impression on the condenser). Refer to Refer to ⇒ "10.1.11 Capacities for Audi A4 (8K) from MY 2008, Audi A5 Coupe and Sportback (8T) from MY 2008, Audi Q5 (8R or 83 for China) from MY 2008, Audi A5 Cabriolet (8F) from MY 2009, and Audi Q5 Hybrid (8R) from MY 2011", page 332 and the ⇒ Electronic Parts Catalog (ETKA).
- For additional information, refer to <u>⇒ page 386</u>.

Audi Q5 and Audi Q5 Hybrid



Note

Applies also to the Audi SQ5.

Ve- hicle type	Pro- duction period	Total quantity of oil in refrig- erant circuit in cm ³	Quantity of re- frigerant oil in replacement compressor in cm ³ Protect	Differing fea- tures of this refrigerant cir- cuit ed by copyright. Copying
Audi Q5	From 09/200 8 through 06/201 2 / 08/201 2 (gradual change , see notes)	150 ⁺ / ₋ 10	150 ⁺ / ₋ 10 ^{with}	respect "Denso" the A/C compressor from type "6 SEU 14" and (compressor with the part number 8K0 xxx xxx)

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Ve- hicle type	Pro- duction period	Total quantity of oil in refrig- erant circuit in cm ³	Quantity of re- frigerant oil in replacement compressor in cm ³	Differing fea- tures of this refrigerant cir- cuit
	From 08/201 1 through 06-08/2 012 (with a specific engine, running change s, see notes)	rmitted unless authoris	pying for private or comed by AUDI AG. AUDI AGectness of information in	G does partimum -or
	From 06-08/2 012 (run- ning change s, see notes)	110 + / - 10	110 + / _ 10	• "Denso" A/C compressor type "6 SES 14" without A/C clutch or type "6 SAS 14" with sole- noid coupling (A/C compres- sor with the part num- ber 8T0 xxx xxx)
Audi Q5 Hy- brid	From 05/201 1	200 + / - 20	200 + / _ 20	Electrically- driven A/C compres- sor manu- factured by "Denso"

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- From 06/2012 through 08/2012, the refrigerant circuit (A/C compressor, condenser, evaporator etc.) was gradually changed (depending on the engine and the vehicle version). This resulted in a different capacity for the refrigerant (identifiable by the information label for the refrigerant circuit) and the refrigerant oil for these vehicles. Refer to Refer to "10.1.11 Capacities for Audi A4 (8K_) from MY 2008, Audi A5 Coupe and Sportback (8T_) from MY 2008, Audi Q5 (8R_ or 83_for China) from MY 2008, Audi A5 Cabriolet (8F_) from MY 2009, and Audi Q5 Hybrid (8R_) from MY 2011", page 332 and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).
- For the Audi Q5 Hybrid there is no change in MY 2012 to the refrigerant circuit (refer to the other models).
- A/C compressors with an installed A/C Clutch N26- are being gradually introduced for specific 4-cylinder TDI engines starting from 08/2011. Refer to ⇒ Electronic Parts Catalog (ETKA) .
- The changed components (A/C compressor, condenser) can only be differentiated by the part number on the outside (data plate on the A/C compressor, data plate or impression on the condenser). Refer to Refer to ⇒ "10.1.11 Capacities for Audi A4 (8K) from MY 2008, Audi A5 Coupe and Sportback (8T) from MY 2008, Audi Q5 (8R or 83 for China) from MY 2008, Audi Q5 (8F) from MY 2009, and Audi Q5 Hybrid (8R) from MY 2011", page 332 and the ⇒ Electronic Parts Catalog (ETKA) .
- An electrical A/C compressor manufactured by "Denso" (Electrical A/C Compressor - V470- with A/C Compressor Control Module - J842-) is installed at the start of production on the Audi Q5 Hydred by property for production on the Audi Q5 Hydred by property for provide the property of production on the Audi Q5 Hydred by property for provide the property of the pr tor Valve - N280-present in this A/C compressor AG does not guarantee or accept any liability
- ent. Copyright by AUDI AG. A/C compressors with a refrigerant oil quantity of 160 ccm were installed on Audi Q5 Hybrid vehicles at the start of production. Shortly after the start of production, the refrigerant oil quantity was increased to 200 ccm. Do not top off the refrigerant oil quantity on a vehicle in which an A/C compressor with a refrigerant oil capacity of 160 ccm is installed. If, for example, the refrigerant circuit is cleaned (flushed), a full quantity of 200 ccm of refrigerant oil is also to be added to the refrigerant circuit for this vehicle. The replacement A/C compressor already contains the correct amount of refrigerant oil. Refer to the ⇒ Electronic Parts Catalog (ETKA).
- For additional information, refer to ⇒ page 386.

Audi RS 4 and Audi RS 5



Note

Also applies to the Audi RS 5 Cabriolet.



Vehicle type	Production period	Total quantity of oil in re- frigerant circuit in cm ³	Quantity of refrigerant oil in replacement compressor in cm ³	Differing features of this refrigerant circuit
Audi RS 4 and RS 5	◆ RS 4 from 04/2012	150 ⁺ / ₋ 10	150 ⁺ / ₋ 10	"Denso" A/C compressor "7 SEU 17"
K3 3	♦ RS 5 from 03/2010		MA	



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- ♦ For additional information, refer to <u>⇒ page 386</u>.



Additional information



- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit
- At the start of production, A/C compressors manufactured by "Denso" (type "6 SEU 14" on vehicles with a 4- and 6-cylinder engine and type "7 SEU 17" on vehicles with an 8-cylinder engine) were installed. These A/C compressors do not have an A/C clutch (they are driven continuously by the engine). In MY 2012, type "6 SEU 14" A/C compressors were gradually replaced by type "6 SES 14". A/C compressors from other manufacturers may also be installed at a later time, depending on the engine. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- On the Audi Q5 hybrid an electrically-driven A/C compressor with integrated control electronics is installed.
- For certain engines (for example, vehicles with a 4-cylinder TDI engine) and versions, A/C compressors (type "6 SAS" 14") are gradually being used from MY 2012 that have an additional A/C Clutch - N25- installed on the belt pulley. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep Gr. 87; Refrigerant Circuit (vehicle-specific repair manual), AUDI AG. AUDI AG does not guarantee or accept any liability and the ⇒ Electronic Parts Catalog (ETKA) respect to the correction ss of information in this document. Copyright by AUDI AG.
- These A/C compressors are available as replacement parts with different oil capacities, therefore note the oil capacity in the A/C compressor and the exact part number. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the *⇒ Electronic Parts Catalog (ETKA) .*
- The reason for the different oil capacities inside the A/C compressor is due to the design of the A/C compressor (with or without an oil separator on the high pressure connection) or to the design of the refrigerant circuit if the A/C compressors are have the identical design. Pay attention to the different capacities. Too much oil in the circuit leads to higher pressures and reduces cooling output of the system. Too little oil may lead to lubrication problems in the compressor.
- A data plate may be attached to the A/C compressor by the manufacturer, indicating the part number and refrigerant oil quantity.
- A/C compressors with A/C Clutch N25- and part number 8TO 260 805 with the index "C" are installed at the start of production. For these A/C compressors, a refrigerant oil capacity of 80 ± 10 cm³ is entered on the data plate. The refrigerant oil quantity was also raised for this A/C compressor to 110 \pm 10 cm ³ shortly after the start of production.
- 10.2.14 Capacities for Audi A4 (8W_) from MY 2016, Audi A4 (86_ for China) from MY 2017, Audi A5 (F5) from MY 2016,

Audi Q5 (FY_) from MY 2017, Audi Q5 (87 for China) from MY 2019



Note

Also applies to Audi A4 allroad, Audi A4 (Typ 86_ for China), Audi Á5 (all versions), etc.

Features of the refrigerant system:

- **Expansion Valve**
- Receiver/Dryer
- Refrigerant line with inner heat exchanger
- Mechanical A/C compressor manufactured by "Denso" or "Sanden" with A/C Compressor Regulator Valve - N280-, with or without A/C Clutch - N25- (depending on the engine). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Ve- hicle type	Pro- duction period	Total quantity of oil in refrig- erant circuit in cm ³	Quantity of re- frigerant oil in replacement compressor in cm ³	Differing fea- tures of this refrigerant cir- cuit
Audi A4 Audi A5 Audi Q5	From 07/201 5	110 + /- 10	110 + / _ 10	"Denso" A/C com- pressor
		100 + /_ 10	100 + / _ 10	"Sanden" A/C compressor



Note

- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit
- There are different refrigerant oils, depending on the A/C compressor manufacturer. Refer to Refer to ⇒ "10.2.1 Approved Refrigerant Oils "it page 362 and the merc Electronic part or in whole, is not Parts Catalog (ETIKA) authorised by AUDI AG. AUDI AG does not guarantee or accept any liability to the correctness of information in this document. Copyright by AUDI AG.

10.2.15 Capacities for Audi 100 / Audi A6 (4A_) through MY 1998

- Restrictor
- Reservoir
- "Denso" or "Zexel / Valeo" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .

Vehicle type	Production period	Total quantity of oil in refrig- erant circuit in cm ³	Quantity of refrigerant oil in replace- ment compressor in cm ³
Audi 100/ Audi A6	From 10/1992 to 03/1997	250 + 50	250 + 50

- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit" Components, Replacing", page 299.
- The Audi 100 and Audi A6 were equipped with different A/C compressors depending on engine and production period. Exclusive use was made at the start of production of "Zexel / Valeo" A/C compressors. From MY 1996, "Denso" A/C compressors were gradually introduced on vehicles with 6-cylinder engines. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ET-KA).
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".

10.2.16 Capacities for Audi A6 (4B_) from MY 1998 and Audi allroad through MY 2005

- Restrictor
- Reservoir
- "Denso" or "Zexel / Valeo" A/C compressors with A/C Clutch N25- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific Repair Manual) and to the ⇒ Electronic Parts Catalog (ETKA).

Vehicle type	Production peri- od	Total quantity of oil in refrigerant circuit in cm ³	Quantity of refrigerant oil in replacement compressor in cm ³	Differing features of this refrigerant circuit
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6-cylinder gaso- line engine ex- cept 3.0L		A A B		
Audi A6/Audi all- road • 4-cylinder diesel engine	From 04/1997 to 05/2001	250 + 50	250 + 50	See notes below
6-cylinder diesel engine				
(see notes for Audi Allroad)				



Vehicle type	Production peri- od	Total quantity of oil in refrigerant circuit in cm ³	Quantity of refrigerant oil in replacement compressor in cm ³	Differing features of this refrigerant circuit
Audi A6 • 8-cylinder engine (with chain-driven camshaft)	From 04/1997 all	250 + 50	250 + 50	See notes below

- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacing", page 299
- The Audi A6 are equipped with different A/C compressors depending on engine and vehicle date of manufacture.
- From MY 2002, the Audi A6 features compressors with A/C clutch or regulator valve (different oil quantities) depending on the engine. For the Audi allroad with 6-cylinder diesel engine, the change over began in MY 2003. Ŕefer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and ⇒ Electronic Parts Catalog (ETKA) .
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".

Features of the refrigerant system:

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Reservoir

"Denso" A/C compressor with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Vehicle type	Production period	Total quantity of oil in refrigerant circuit in cm ³	Quantity of re- frigerant oil in re- placement com- pressor in cm ³	Differing features of this re- frigerant circuit
Audi A6 • 4-cylinder gasoline engine 2.0L	All	220 + 20	220 + 20	A/C compressor type "6 SEU 12" or "7 SEU 16" (see notes below)
6-cylinder gaso- line engine 3.0L				
Audi A6/Audi allroad • 4-cylinder diesel engine	From 05/2001	245 + 20	245 + 20	A/C compressor type "6 SEU 12" or "7 SEU 16" (see notes below)
6-cylinder diesel engine				
(see notes for Audi Allroad)				

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Vehicle type	Production period	Total quantity of oil in refrigerant circuit in cm ³	Quantity of re- frigerant oil in re- placement com- pressor in cm ³	Differing features of this re- frigerant circuit
Audi allroad • 8-cylinder engine (with chain-driv- en camshaft)	All	220 + 20	220 + 20	A/C compressor type "7 SEU 17" (see notes below)



Note

- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit
- The Audi A6 are equipped with different A/C compressors depending on engine and vehicle date of manufacture.
- From MY 2002, the Audi A6 features compressors with A/C clutch or regulator valve (different oil quantities) depending on the engine. For the Audi Allroad with 6-cylinder diesel engine, the change occurred gradually in MY 2003.
- The A/C compressor with an A/C Compressor Regulator Valve - N280- is available as a replacement part with different oil capacities, therefore pay attention to the exact part number. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and to the ⇒ Electronic Parts Catalog (ETKA)
- The reason for the different oil capacities inside the A/C compressor is due to the design of the A/C compressor (with or without an oil separator on the high pressure connection) rotal purposes, in part or in whole, is not or to the design of the refrigerant circuit if the A/C compressions not guarantee or accept any liability sors are have the identical design. Pay attention to the different capacities. Too much oil in the circuit leads to higher pressures and reduces cooling output of the system. Too little oil may lead to lubrication problems in the compressor.
- A data plate may be attached to the A/C compressor by the manufacturer, indicating the part number and refrigerant oil quantity.

Capacities for Audi A6 (4F_) from MY 10.2.17 2005



Note

Also applies to the Audi S 6 and the Audi RS 6.

- Restrictor
- Reservoir
- "Denso" A/C compressor with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Vehicle type	Production period	Total quantity of oil in refrig- erant circuit in cm ³	Quantity of refrigerant oil in replace- ment compressor in cm ³
Audi A6 /S 6	From 04/2004	130 + / _ 10	130 + / _ 10
Audi RS 6	From 05/2008	130 + / _ 10	Depending on the version of the A/C compressor (see note below) ◆ 130 + / _ 10



- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted.
- The Audi A6 are equipped with different A/C compressors depending on engine and vehicle date of manufacture.
- ♦ Different versions of this A/C compressor are available as a replacement part, therefore note the exact part number and refer to the ⇒ Electronic Parts Catalog (ETKA)
- A data plate may be attached to the A/C compressor by the manufacturer, indicating the part number and refrigerant oil quantity.
- The A/C compressor installed at the factory for a 10-cylinder TFSI engine (Audi RS 6) has a smaller quantity of refrigerant oil (70± 10 cm 3) than the A/C compressor for the 10-cylinder FSI engine (Audi S 6) and other engines (130 ± 10 cm 3) whole, is not due to the different testing procedures for the engine (for the tany liability 10-cylinder FSI and 10-cylinder TFSI engines, the A/C com-AUDI AG. pressors at present differ only in part number and quantity of refrigerant oil, see also the A/C compressor data plate). When adjusting the total oil quantity in the refrigerant circuit for a 10-cylinder TFSI engine (Audi RS 6) at the factory, the oil quantity that was reduced in the A/C compressor (60 ± 10 cm ³), has to be filled somewhere else in the refrigerant circuit. This is not necessary in service because the replacement A/C compressor is delivered with the original oil capacity (130 ± 10 cm3) (it would only be necessary in service if a new A/C compressor with a lower oil capacity is being installed). Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- 10.2.18 Capacities for Audi A6 (4G_ or 4X_ for China) from MY 2011, Audi A7 (4G or 4X_ for China) from MY 2011, Audi A6 Hybrid (4G_{_}) from MY 2012 and A6 e-tron (4G_) from MY 2017



Note

Also applies to the Audi S and the Audi RS models.

- **Expansion Valve**
- Receiver/Dryer

- Refrigerant pipe with inner heat exchanger.
- Mechanically driven "Denso" A/C compressor, with A/C Compressor Regulator Valve - N280- (and depending on engine, also with an A/C Clutch - N25- from MY 2014). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) (all vehicles except on the Audi A6 Hybrid and A6 e-tron).
- Vehicles with a high-voltage system (Audi A6 Hybrid) have electrical "Denso" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- Vehicles with a high-voltage system (Audi A6 e-tron) have electrical "Sanden" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .

Vehicle type	Production period	Total quantity of oil in re- frigerant circuit in cm ³	Quantity of refrigerant oil in replacement compressor in cm ³	Differing features of this refrigerant circuit
Audi A6	From 02/2011	120 + / _ 10	120 + / _ 10	"Denso" A/C compressor with oil separator
Audi A7	From 10/2010	120 ⁺ / ₋ 10	120 + / - 10	A/C compressor type (for example, "6 SEU 14" or "6 SBU 14")
Audi A6 / A7	From 06/2014	110 ⁺ 20 / ₋ 10	110 + / _ 10	"Denso" A/C compressor (for example, type "6 SES 14" or "6 SAS 14") with oil separator (with and without A/C Clutch - N25-)
Audi A6 Hybrid	From 11/2011	160 + / _ 20	160 + / - 20 Protected by copyright. Copying for p permitted unless authorised by AUD	Ŭ ,
Audi A6 e-tron	From 09/2016	220 ⁺ / ₋ 10	220 ⁺ / ₋ 10	• Electrically-driven "Sanden" A/C compressor (SP-A2 refrigerant oil. Refer to Refer to ⇒ "10.2.1 Approved Refrigerant Oils", page 362.)





- The type designation 4X_ is used instead of the type designation 4G_ for specific versions in China
- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacing", page 299 .
- At the start of production, mechanically-driven "Denso" A/C compressors were installed on all vehicles except for the Audi A6 Hybrid (and the Audi A6 e-tron). A/C compressors from other manufacturers may also be installed at a later time. Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- An electrical A/C compressor manufactured by "Denso" (Electrical A/C Compressor - V470- with A/C Compressor Control Module - J842-) is installed at the start of production on the Audi A6 Hybrid. There is no A/C Compressor Regulator Valve - N280- present in this A/C compressor.
- ♦ At the start of production, an electrical "Sanden" A/C com-pressor (Electrical A/C Compressor V470- with A/C Compressor Control Module - J842-) is installed on the Audi A6 e-tron. There is no A/C Compressor Regulator Valve - N280present in this A/C compressor.
- A/C compressors with a refrigerant oil quantity of 200 ccm were installed at the start of production on Audi A6 Hybrid vehicles. Shortly after the start of production, the refrigerant oil quantity was reduced to 160 ccm. Do not reduce the es, in part or in whole, is not refrigerant oil quantity on a vehicle in which an A/C compres e or accept any liability sor with a refrigerant oil capacity of 200 ccm is installed off, Copyright by AUDI AG for example, the refrigerant circuit is flushed, a total quantity of 160 ccm of refrigerant is also to be filled in the refrigerant circuit for this vehicle. The replacement A/C compressor already contains the correct amount of refrigerant oil. Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- For certain engines and versions, A/C compressors are gradually being used from MY 2014 that have an additional A/C Clutch - N25- installed on the belt pulley (for example, type "6 SES 14" or "6 SAS 14"). Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- A/C compressors are gradually being used from MY 2015 that have a refrigerant oil amount of 110 ccm in the A/C compressor (for example, type "6 SES 14" or "6 SAS 14"). Refer to ⇒ Heating and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) . On vehicles with these A/C compressors the refrigerant oil quantity in the refrigerant circuit is 110 ccm +20 / -10 ccm (thus the specified refrigerant oil quantity remains valid from 120 ccm ± 10 ccm for customer service).
- As part of a Technical Service Bulletin (TSB), vehicles built through MY 2014 may be retrofitted with a type "6 SES 14" A/C compressor instead of the A/C compressor installed during production. A refrigerant oil capacity of 120 ccm also applies to these vehicles (if necessary, fill with 10 ccm refrigerant oil after flushing the refrigerant circuit and the installation of a new A/C compressor).

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- This A/C compressor is available as a replacement part with different oil capacities, therefore note the oil capacity in the A/C compressor and the exact part number. Refer to the ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .
- The reason for the different oil capacities inside the A/C compressor is due to the design of the A/C compressor (with or without an oil separator on the high pressure connection) or to the design of the refrigerant circuit if the A/C compressors are have the identical design. Pay attention to the different capacities. Too much oil in the circuit leads to higher pressures and reduces cooling output of the system. Too little oil may lead to lubrication problems in the compressor.
- A data plate may be attached to the A/C compressor by the manufacturer, indicating the part number and refrigerant oil quantity.

10.2.19 Capacities for Audi V8 (4C) through MY 1994

Features of the refrigerant system:

- Restrictor (not colored).
- Reservoir
- "Zexel / Valeo" A/C compressor. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .

Vehicle type	Production period	Total quantity of oil in refrigerant circuit in cm ³	Quantity of refrigerant oil in replace- ment compressor in cm ³
Audi V8	From 10/1992 to 10/1993	250 + 50	250 + 50



Note

- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacing", page 299 .
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".

10.2.20 Capacities for Audi A8 (4D_) from MY 1994

- Restrictor
- Reservoir
- "Denso" or "Zexel / Valeo" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .



Vehicle type	Production period	Total quantity of oil in refrigerant circuit in cm ³	Quantity of refrigerant oil in replace- ment compressor in cm ³
Audi A8	From 05/1994	250 + 50	250 + 50



- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacing", page 299.
- Exclusive use was made at the start of production of "Zexel / Valeo" A/C compressors. From MY 1996, production was gradually switched to "Denso" A/Cycompressors Refer to ses, in part or in whole, is not ⇒ Heating, Ventilation and Air Conditioning, Rep. Gr. n8 Zuarantee or accept any liability Refrigerant Circuit (vehicle-specific repair manual) and to the pyright by AUDI AG. ⇒ Electronic Parts Catalog (ETKA).
- Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".

10.2.21 Capacities for Audi A8 (4E_) from MY 2003

- Restrictor
- Reservoir
- "Denso" A/C compressor with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

	Vehicle type	Production period	Total quantity of oil in refrigerant circuit in cm ³	Quantity of refriger- ant oil in replacement compressor in cm ³	Differing features of this refrigerant circuit
A1	udi A8 8-cylinder gasoline engine with 3.7L or 4.2L (except FSI)	From 10/2002 all	200 + / _ 10	200+ / _ 10	A/C compressor type "7 SEU 16" (see notes below)
•	6 and 12-cylinder gasoline engine 6 and 8-cylinder diesel engine	From 10/2002 to 01/2004	200 + / _ 10	200 + / _ 10	A/C compressor type "6 SEU 14", "7 SEU 16" or "7 SEU 17" (see notes below)
•	6, 10- and 12- cylinder gaso- line engine 6 and 8-cylin- der diesel en-	From 01/2004	150 + / _ 10	150+ / _ 10	Compressor type "6 SEU 14" or "7 SEU 17" (see notes below)
•	gine 8-cylinder 4.2L gasoline en- gine (only FSI)				





- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacing", page 299
- The Audi A8 is equipped with different A/C compressors depending on engine and production period.
- This A/C compressor is available as a replacement part with different oil capacities, therefore note the exact part number. Refer to the ⇒ Heating, Ventilation and Air Conditioning, Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).
- At the start of production, the compressor types in the first two lines of the table were supplied with a refrigerant oil quantity of 200 cm ³. These compressors can be recognized from the index of the part number (4E0 260 805 with index "C", "D", "E", "F", "J", "L" or "S"). In MY 2004 (from approximately 01/2004), a gradual change was made to other types of compressor with a refrigerant oil quantity of 150 cm ³. These compressors can be recognized from the index of the part number (4E0 260 805 with the index "G", "H", "T", "M", "N", "Q", or double index, for example, "AB"). Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- The reason for the different oil capacities inside the A/C compressor is due to the design of the A/C compressor (with or without an oil separator on the high pressure connection) or to the design of the refrigerant circuit if the A/C compressors are have the identical design. Pay attention to the different capacities. Too much oil in the circuit leads to higher pressures and reduces cooling output of the system. Too little oil may lead to lubrication problems in the compressor.
- A data plate may be attached to the A/C compressor by the manufacturer, indicating the part number and refrigerant perfitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability quantity. with respect to the correctness of information in this document. Copyright by AUDI AG.

10.2.22 Capacities for Audi A8 (4H_) from 2010 and Audi A8 Hybrid (4H_) from 2012

- **Expansion Valve**
- Depending on the vehicle equipment level with one or two evaporators
- Refrigerant pipe with inner heat exchanger.
- Dryer cartridge in receiver/dryer on condenser
- Mechanical "Denso" A/C compressor with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) (all vehicles except Audi A8 Hybrid).
- Vehicles with a high-voltage system (Audi A8 Hybrid) have electrically-driven "Denso" A/C compressors. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA) .





Caution

Capacities may vary for the refrigerant and the refrigerant oil on vehicles with an 8-cylinder TDI engine.

♦ Due to the installed location of the A/C compressor (above the engine), the refrigerant oil capacity may vary from what is on the A/C compressor data plate on vehicles with an 8-cylinder TDI engine.

Vehicle type	Pro- duction period	Total quan- tity of oil in refrigerant circuit in cm ³	Quantity of refrigerant oil in re- placement compressor in cm ³	Differing fea- tures of this refrigerant circuit	
Audi A8 (all vehi- cles ex- cept for the 8-cyl- inder TDI engine)	From 03/201 0				
♦ Vehicle with one evaporator		130+/ _ 10	• 130 ⁺ / ₋ 10	• One evapora-	
♦ Vehicle with two evaporators		130+/_10		Two evaporators (pay attention to the notes below)	
Audi A8 (only the 8-cylinder TDI en- gine)					
◆ Vehi- cle with one evap- orator		180 ⁺ / ₋ 10	◆ 130 ⁺ / - 10	One evaporator tor	or commercial purposes, in part or in whole,
◆ Vehicle with two evaporators		180+/ _ 10	permitted unless aud with respect to the	horised by AUD AG. A	AUDI AG does not guarantee or accept any lation in this document. Copyright by AUDI A

Vehicle type	Pro- duction period	Total quantity of oil in refrigerant circuit in cm ³	Quantity of refrigerant oil in re- placement compressor in cm ³	Differing fea- tures of this refrigerant circuit
udi A8 Hybrid	From 01/201 2	160+/ _ 20	160 ⁺ / ₋ 20	 An evaporator in the A/C unit Electrically-Driven A/C Compressor 2. Evaporator in Battery Cooling Module



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- A specified quantity of refrigerant oil can be found in the replacement compressor (currently 130 ± 10 cm³, depending on the A/C compressor, see data plate). This refrigerant oil quantity currently includes vehicles with one and two evaporators for this refrigerant circuit with a specified oil capacity, with the exception of vehicles with an 8-cylinder TDI engine (for vehicles with an 8-cylinder TDI engine, see below). Vehicles with two evaporators have the same oil capacity as vehicles having just one evaporator. Due to the longer refrigerant pipes and the second evaporator, this vehicle does not require more refrigerant inside the refrigerant circuit. The refrigerant circuit in this vehicle is designed so that a smaller portion of the refrigerant oil gets into the refrigerant pipes leading to the second evaporator when the A/C system is being used. If the A/C compressor is replaced after cleaning the refrigerant circuit, this refrigerant oil quantity must therefore be added to the refrigerant circuit in vehicles with two evaporators (due to the second evaporator). If A/C compressor is replaced without having to clean the refrigerant circuit, the refrigerant oil quantity in the new A/C compressor to be installed must be adjusted to the oil quantity poured out of the old A/C compressor. Refer to Refer to
- For vehicles with an 8-cylinder TDI engine from the VIN number 4H_ BN 018846, the refrigerant oil quantity in the refrigerant circuit was increased from 130 cubic cm to 180 cubic cm. To compensate, the refrigerant quantity must be slightly reduced. Since the filling capacity information on the information label does not change, proceed as follows: on vehicles that were built up to the specified vehicle identification number, check whether the refrigerant oil capacity was already topped up during a previous workshop visit. If not, fill the refrigerant circuit with an additional 50 ccm of refrigerant oil. Then correct the fill capacity for the refrigerant on the information label with talk at a provider for a provider provider providers in part or in whole, is not the provider provider by a provider by guarantee or accept any liability the provider by guarantee or accept any liability the refrigerant circuit, with the specified refrigerant quantitient. Copyright by AUDI AG Then document the changes that have taken place in the vehicle data. For vehicles built from the specified VIN, check the refrigerant capacity specification on the information label and if necessary, amend the quantities with a waterproof marker accordingly and then fill the refrigerant circuit with the specified refrigerant quantity.
- The same refrigerant oil quantity was added during production for other engines as for vehicles with an 8-cylinder TDI engine up to the vehicle identification number 4H BN 018845. Vehicles with an 8-cylinder TDI engine from the VIN 4H 018846 are filled with a larger amount of refrigerant oil during production. This refrigerant oil quantity applies retroactively to all vehicles with an 8-cylinder TDÍ engine. If, on vehicles with an 8-cylinder TDI engine, the refrigerant circuit is refilled or, for example, the A/C compressor is replaced after cleaning the refrigerant circuit, check the refrigerant oil quantity in the refrigerant circuit and refill it with the correct quantity if necessary (for example, in open lines or component connections, or via the A/C service station before filling with refrigerant). If the A/C compressor is replaced without needing to clean the refrigerant circuit, adjust the refrigerant oil quantity in the newly installed A/C compressor so that it corresponds with the quantity of oil that was poured out of the old A/C compressor (and, if necessary, fill accordingly for vehicles up to the specified VINs above). Refer to Refer to ⇒
- The reason for the different oil capacities inside the A/C compressor is due to the design of the A/C compressor (with

or without an oil separator on the high pressure connection) or to the design of the refrigerant circuit if the A/C compressors are have the identical design. Pay attention to the different capacities. Too much oil in the circuit leads to higher pressures and reduces cooling output of the system. Too little oil may lead to lubrication problems in the compressor.

- These A/C compressors are available as replacement parts with different oil fill capacities, therefore pay attention to the exact part number. Refer to the ⇒ Electronic Parts Catalog (ETKÄ) .
- Too much oil in the circuit leads to higher pressures and reduces cooling performance of the A/C system. Too little oil may lead to lubrication problems in the compressor, therefore note the specified refrigerant oil quantities.
- A data plate may be attached to the A/C compressor by the manufacturer, indicating the part number and refrigerant oil quantity.
- For all vehicles except for the Audi A8 Hybrid, the mechanirivate or commercial purposes, in part or in whole, is not cally driven A/C compressors manufactured by a plyinght. Copying for private or commercial purposes, in part of in whole, is not cally driven A/C compressors manufactured help a plenso by A/E) AG. AUDI AG does not guarantee or accept any liability installed at the start of production. A/C compressors from of information in this document. Copyright by AUDI AG other manufacturers may also be installed at a later time. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual).
- An electrical A/C compressor manufactured by "Denso" (Electrical A/C Compressor - V470- with A/C Compressor Control Module - J842-) is installed at the start of production on the Audi A6 Hybrid. There is no A/C Compressor Regulator Valve - N280- present in this A/C compressor.
- A/C compressors with a refrigerant oil quantity of 200 ccm were installed at the start of production on Audi A8 Hybrid vehicles. Shortly after the start of production, the refrigerant oil quantity was reduced to 160 ccm. Do not reduce the refrigerant oil quantity on a vehicle in which an A/C compressor with a refrigerant oil capacity of 200 ccm is installed. If, for example, the refrigerant circuit is flushed, a total quantity of 160 ccm of refrigerant is also to be filled in the refrigerant circuit for this vehicle. The replacement A/C compressor already contains the correct amount of refrigerant oil. Refer to the ⇒ Electronic Parts Catalog (ETKA) .

Capacities for Audi Q7 (4L_), from MY 10.2.23

Capacities for Audi Q7 (4L_), from MY 2006

- Expansion Valve
- Depending on the vehicle equipment level with one or two evaporators
- Dryer cartridge in receiver/dryer on condenser
- "Denso" A/C compressor with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Vehicle type	Pro- duction period	Total quan- tity of oil in refrigerant circuit in cm ³	Quantity of refrigerant oil in re- placement compressor in cm ³	Differing fea- tures of this refrigerant circuit
Audi Q7 (4L_)	From 02/200 6			
◆ Vehicle vith one evaporator		140, 150 or 160 ⁺ 15 / - 10 (de- pending on the installed A/C com- pressor)	♦ 140 ⁺ / ₋ 10 (A/C compressor for a vehicle with a 6- cylinder TDI en- gine or with a 12- cylinder engine)	 One evaporator Compressor type "6 SEU 14" or "7 SEU 16" (see notes below)
◆ Vehicle with two evaporators		240, 250 or 260 + 15 / _ 10 (de- pending on installed A/C com- pressor, re- frigerant oil quantity in A/C com- pressor plus 100)	◆ 150 ⁺ / ₋ 10 (A/C compressor for a vehicle with an 8- cylinder engine or with a 6- cylinder 3.2L FSI engine)	Two evapora- tors (pay attention to the notes be- low)
			◆ 160 ⁺ / ₋ 10 (A/C compressor for a vehicle with a 6- cylinder 3.6L FSI engine)	



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- The replacement compressor is already filled with a specific refrigerant oil quantity (currently 140, 150 or 160 ± 10 cm³, depending on the A/C compressor), this refrigerant oil quantity corresponds to the oil quantity designated for this refrigerant circuit on vehicles with one evaporator. On vehicles with two evaporators, a larger refrigerant oil quantity is required in the refrigerant circuit (currently an additional 100 cm³) because of the longer refrigerant lines and the second evaporator. If the compressor is replaced after cleaning the refrigerant circuit, this refrigerant oil quantity must therefore be added to the refrigerant circuit (for example, into opened lines or component connections) in vehicles with two evaporators. If the compressor is replaced without having to clean the refrigerant circuit, the refrigerant oil quantity in the new compressor to be installed must be adjusted to the oil quantity poured out of the old compressor. Refer to Refer to Refrigerant Circuit Components, Replacing'
- These A/C compressors are available as replacement parts with different oil fill capacities, therefore pay attention to the exact part number. Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- The reason for the different oil capacities inside the A/C compressor is due to the design of the A/C compressor (with or without an oil separator on the high pressure connection) or to the design of the refrigerant circuit if the A/C compressors are have the identical design. Pay attention to the different capacities. Too much oil in the circuit leads to higher pressures and reduces cooling output of the system. Too little oil may lead to lubrication problems in the compressor.
- A data plate may be attached to the A/C compressor by the manufacturer, indicating the part number and refrigerant oil quantity.

10.2.24 Capacities for Audi Q7 (4M_) from MY

The refrigerant oil capacities can be found in the vehicle-specific repair manual. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 00; Technical Data; Approved Refrigerant Oils and Refrigerant Oil Capacities .

Capacities, Audi R8 (42_) from MY 2008, Audi R8 (4S_) from MY 2015 10.2.25

Characteristics of the Audi R8 (42) refrigerant circuit from MY 2008: Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not

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- Reservoir
- Two condensers switched in sequence
- "Denso" A/C compressor with A/C Compressor Regulator Valve - N280- . Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Refrigerant Circuit (vehicle-specific repair manual) and the ⇒ Electronic Parts Catalog (ETKA).

Characteristics of the Audi R8 (4S_) refrigerant circuit from MY 2015:

- Expansion Valve
- Receiver/Dryer (with Dryer)



- Two condensers switched in sequence
- "Denso" A/C compressor with A/C Compressor Regulator Valve N280- . Refer to \Rightarrow Heating, Ventilation and Air Conditioning; Rep. Gr. 87 ; Refrigerant Circuit (vehicle-specific repair manual) and the \Rightarrow Electronic Parts Catalog (ETKA) .

Vehicle type	Production period	Total quantity of oil in refrigerant circuit in cm ³	Quantity of refriger- ant oil in replacement compressor in cm ³	Differing features of this refrigerant circuit
Audi R8 (42_)	From 03/2007 to 11/2012	◆ From 11/2012, the oil fill capacity was retroactively increased from 150 to 200 cm ³ for these vehicles.	200 ⁺ / ₋ 10 ◆ Depending on the part number, the replacement A/C compressor may only be filled to 150 cm³, if necessary add an additional 50 cm³ (see notes below).	A/C compressor "7 SEU 17"
			200 /2 10	
Audi R8 (4S_)	From 08/2015	150 + / _ 10	150 + / _ 10	A/C compressor type "6 SES 14"



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- The replacement compressor contains the full quantity of oil intended for the refrigerant circuit. If the A/C compressor is being replaced, the quantity of oil in the A/C compressor must be adjusted. Refer to Refer to ⇒ "9 Refrigerant Circuit Components, Replacing", page 299
- These A/C compressors are available as replacement parts with different oil fill capacities, therefore pay attention to the exact part number. Refer to the ⇒ Electronic Parts Catalog (ETKA) .
- From the VIN 429 DN 000751 (time period of production from 11/2013) the refrigerant quantity for the refrigerant circuit was raised from 650 g to 680 g (22.9 oz to 24 oz) and the refrigerant oil quantity was raised from 150 ccm to 200 ccm. The increased refrigerant and refrigerant oil capacity applies retroactively to all vehicles. On vehicles that were built up to the specified vehicle identification number, check whether the refrigerant oil capacity was already topped up during a previous workshop visit. If not, fill the refrigerant circuit with an additional 50 ccm of refrigerant oil. Finally, check the refrigerant capacity information on the information label and if necessary, attach a new information label with the correct capacity and language (for example, the identification label with the part number 420 010 535 and the index BA with the labeling in German and English). Refer to the ⇒ Electronic Parts Catalog (ETKA) and ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87; Component Location Overview - A/C System (vehicle-specific repair manual). If there is no information label available with the correct capacity and language, amend the capacity information on the existing information label accordingly using a waterproof marker. Finally, increase the refrigerant oil quantity in the refrigerant circuit by 50 ccm if necessary and fill the refrigerant circuit with the above-specified refrigerant amount. Refer to Refer to ⇒ "10.1.23 Capacities, Audi R8 (42) from I 2008, Audi R8 (4S_) from MY 2015", page 358
- A data plate may be attached to the A/C compression authorised by AUDI AG. AUDI AG does not guarantee or accept any liability *the manufacturer, indicating the part number and reficigerant* rrectness of information in this document. Copyright by AUDÍ AG. oil quantity (however, this data plate is not visible on an installed A/C compressor on the Audi R8). Therefore note in the vehicle records (and on the information label with the refrigerant quantity) for vehicles that were installed with an A/C compressor with the smaller refrigerant quantity during production (vehicles up to the above-mentioned VIN), that the refrigerant oil quantity was already increased by 50 ccm during a workshop visit.
- The reason for the different oil capacities inside the A/C compressor is due to the design of the A/C compressor (with or without an oil separator on the high pressure connection) or to the design of the refrigerant circuit if the A/C compressors are have the identical design. Pay attention to the different capacities. Too much oil in the refrigerant circuit leads to higher pressures and reduces cooling performance of the A/C system. Too little oil may lead to lubrication problems in the compressor, therefore note the specified refrigerant oil quantities.



11 **Tools and Testing Equipment**

- ⇒ "11.1 Testing Equipment, Tools and Materials", page 405
- ⇒ "11.2 Tools and Materials Available from Distribution Center or Importer", page 408
- ⇒ "11.3 Commercially Available Tools and Materials", page 411
- ⇒ "11.4 Improvised Tools", page 413

11.1 Testing Equipment, Tools and Materi-

- ⇒ "11.1.1 Tools and Materials Available from Distribution Center or Importer", page 405
- ⇒ "11.1.2 Commercially Available Tools and Materials", page 406
- ⇒ "11.1.3 Improvised Tools", page 407



Note

This list outlines the testers, tools and materials required for expert refrigerant circuit repair work.

11.1.1 Tools and Materials Available from Distribution Center or Importer

Overview	Side
A/C Service Station with Flushing Device , currently available A/C service stations. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools or com Special Tools and Equipment: A/C and Heating) less authorised by AUDI AG. AUDI A — With program installed for flushing the refrigerant circuit using refrigerant R134a, and corresponding flushing equipment	Refer to the illustration and the mercia Electronic Parts Catalog (ET-G does not guarantee KA) ept any liability this document. Copyright by AUDI AG.
Refrigerant Circuit Flushing Device, currently available A/C service stations. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating). - For flushing the refrigerant circuit using refrigerant R134a, also to be used for older service stations with a reservoir capacity of at least 10 kg (22.05 lbs) refrigerant R134a (flushing must be performed manually).	Refer to the ⇒ Electronic Parts Catalog (ETKA) .
Refrigerant Circuits Adapter Set 1 - VAS 6338/1 Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating). - For connecting service station to refrigerant circuit and for bridging certain removed components while flushing	Refer to the ⇒ Electronic Parts Catalog (ETKA) .
Adapter Adapter - VAS 6338/40- and Adapter Adapter - VAS 6338/41 Refer to ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating). - To flush the electrical A/C Compressor for vehicles with a high-voltage system	Refer to the ⇒ Electronic Parts Catalog (ETKA) .
Shut-Off Valves Shut-off Valves - VAS 6338/42 Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating). — To bridge certain removed components when flushing the refrigerant circuit on vehicles with a high-voltage system	
Shut-Off Valves Refrigerant Circuit Adapter Set - Adapter - VAS 6338/47 Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating). - For specified vehicles with high-voltage system (for example the Audi Q7 e-tron) to bridge the removed check valves when flushing the refrigerant circuit.	Refer to the ⇒ Electronic Parts Catalog (ETKA) .

Overview	Side
Leak detection unit, currently available leak detection units. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).	Refer to the illustration and the ⇒ Electronic Parts Catalog (ET-KA) .
A/C Clutch Set (Zexel / Valeo A/C Compressors) V.A.G 1719. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).	Refer to the illustration and the ⇒ Electronic Parts Catalog (ET-KA) .
 A/C Adapter Set V.A.G 1785/1-10. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating). For connecting service station to refrigerant circuit and for bridging certain removed components while flushing and blowing through 	Refer to the illustration and the ⇒ Electronic Parts Catalog (ET-KA) .
A/C Adapter Set - Valve Adapter 9 and 10 V.A.G 1785/9 and V.A.G 1785/10. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).	Refer to the illustration and the ⇒ Electronic Parts Catalog (ET-KA) .
A/C Adapter Set V.A.G 1786 with service connection. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).	Refer to the illustration and the ⇒ Electronic Parts Catalog (ET-KA) .
O-rings. Refer to the ⇒ Electronic Parts Catalog (ETKA) .	Refer to the illustration and the ⇒ Electronic Parts Catalog (ET-KA) .
Refrigerant oil to Refer to the SpyElectronic Parts Catalog (ETKA) in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.	Refer to the illustration and the ⇒ Electronic Parts Catalog (ET- KA) .
Leak Detection Kit VAS 6201A with the following contents. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating). ◆ Leak Detection Kit - Hand Pump w/Cartridge VAS 6201/1	Refer to the illustration and the ⇒ Electronic Parts Catalog (ET-KA) .
◆ Leak Detection Kit - Cartridge VAS 6201/2	
◆ Leak Detection Kit - Cleaning Solution VAS 6201/3	
♦ UV-leak Detection Lamp VAS 6201/4A	
◆ Leak Detection Kit - Replacement Bulb VAS 6201/5	
◆ Leak Detection Kit - Eye Protection VAS 6201/6	
◆ Leak Detection Kit - Sticker VAS 6201/7	
◆ Leak Detection Kit - Protective Gloves VAS 6201/9	
◆ Leak Detection Kit - Filler Tube VAS 6201/8	
♦ System Case VAS 6201/10	
Adapter set for Service connections. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).	Refer to the illustration and the ⇒ Electronic Parts Catalog (ET-KA) .
Air Conditioner Couplings Release Tool Air Conditioner Couplings Release Tool - T40149 Refer to ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools)	Refer to the ⇒ Electronic Parts Catalog (ETKA) .
Retaining Ring Retaining Ring - T40232- for the refrigerant lines quick-release coupling. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools).	Refer to the ⇒ Electronic Parts Catalog (ETKA) .

Commercially Available Tools and Materials 11.1.2

Overview	Side
Slat comb	See illustration
Charging hoses 5/8" - 18 UNF with valve opener	See illustration
Connection piece for refrigerant cylinder and seal with quick-release coupling connection or threaded connection 5/8" - 18 UNF	See illustration



Overview	Side
Valve caps 5/8"-18 UNF	See illustration
Pressure gauge set with pressure reducer for nitrogen	See illustration
Quick-release coupling adapter for service connections (quantity: 2 included in delivery package of A/C service station).	See illustration
The wrench size depends on the threaded connections on the refrigerant lines.	Not illustrated
Valve opener for charging hoses	Not illustrated
Connecting nipple for conical seal 5/8"-18 UNF	Not illustrated
Compressed-air gun with rubber end piece	Not illustrated
Combined fine filter unit for compressed-air system (oil edirt and water sepa-no rator as used for painting facilities).	guarantee Not illustrated nent. Copyright by AUDI AG.
Valve opener for Schrader valve	Not illustrated
Hand shut-off valve 5/8"-18 UNF	Not illustrated
Recycling container for refrigerant R134a	Not illustrated
Digital thermometer	Not illustrated
Protective gloves not illustrated	Not illustrated
Protective Eyewear	Not illustrated
Refrigerant R134a with cylinder (capacity as required)	Not illustrated

Improvised Tools 11.1.3

Overview	Side
Charging hose with connection for workshop compressed-air system	Not illustrated

11.2 Tools and Materials Available from Distribution Center or Importer

Service station/ A/C Service Station (this illustration shows for example the V.A.S 6007A). For the currently available A/C service stations, refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).

- Procedure: the operations "testing, extraction (recycling), evacuation and charging" are to be performed in line with the relevant operating instructions.
- The filters and dryers installed are to be replaced at the latest at the end of the period of use specified in the operating instructions and whenever the station has been drained (keep replacement filter to hand). Available from equipment manufacturer. Refer to A/C service station operating instruc-
- Use can also be made of service stations not described here. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).
- Currently available A/C service stations are equipped with a program for flushing the refrigerant circuit; the flushing equipment required for flushing is also included in delivery of these A/C service stations. Refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).

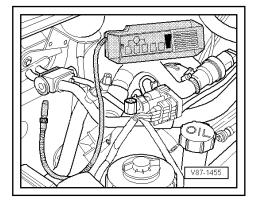


Note

- This A/C service station has the following known units: charging cylinder, pressure gauge set, vacuum pump, shutoff valves and charging hoses.
- One quick-release coupling each (for service connections on high and low-pressure side) is included in the scope of delivery of this service station.
- Depending on the version, the current vacuum display (LED) appears after pressing the "evacuate" button again not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.

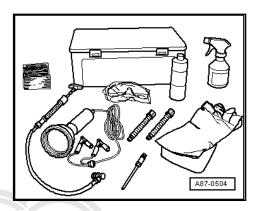
Leak detection unit (for example V.A.G 1796), for the currently available leak detection units refer to the ⇒ Électronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).



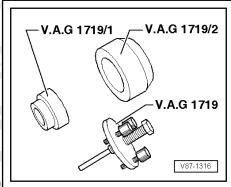




Leak detection system (for example Leak Detection Kit V.A.G. 6201A, for currently available leak detection systems, refer to the ⇒ Electronic Parts Catalog (ETKA) (Tools; Special Tools and Equipment: A/C and Heating).



Puller for A/C Clutch Set V.A.G 1719 (for "Zexel / Valeo" A/C compressor)



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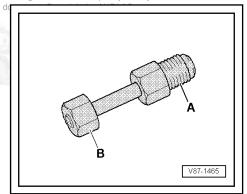
A/C Adapter Set V.A.G 1785/1-10 with respect to the correctness of information in this d

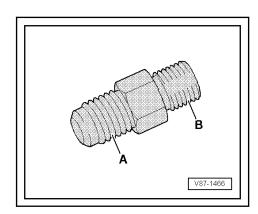
Adapter for cleaning refrigerant circuit (flush with refrigerant R134a refer to Refer to ⇒ "5.5 Refrigerant Circuit, Cleaning (Flushing) with Refrigerant R134a", page 93, or blow through with compressed air and nitrogen refer to Refer to ⇒ "5.4 Refrigerant Circuit, Cleaning with Compressed Air and Nitrogen", page 89.)

- A 5/8"-18 UNF Thread for Conical Seal
- B Union Nut (for Connection with O-ring) with Thread
- ♦ M 18x1.5 V.A.G 1785/1
- ♦ M 20x1.5 V.A.G 1785/2
- ♦ M 24x1.5 V.A.G 1785/3
- ♦ M 28x1.5 V.A.G 1785/4

Adapter

- A 5/8"-18 UNF Thread for Conical Seal
- B Threaded Connection for O-ring
- M18 x 1.5 V.A.G 1785/5
- M20 x 1.5 V.A.G 1785/6
- M24 x 1.5 V.A.G 1785/7
- M28 x 1.5 V.A.G 1785/8



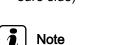


Valve adapter

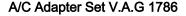
A - 5/8"-18 UNF Thread for Conical Seal

B - Internal Thread with Valve Opener

- M10 x 1.25 V.A.G 1785/9 (for connections with valve on the high-pressure side)
- M12 x 1.5 V.A.G 1785/10 (for connections on the high-pressure side)



- A Schrader valve is screwed into connection -A-.
- A valve opener must be installed in the charging hose connection.
- Various adapters from adapter set are also part of the Repercial purposes, in part or in whole, is not frigerant Circuits Adapter Set 1 will AS 6338/1 AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.



A - A/C Adapter Set - Adapter 1 - V.A.G 1786/1- (only for Connections with Small Valve Insert on Low Pressure Side)

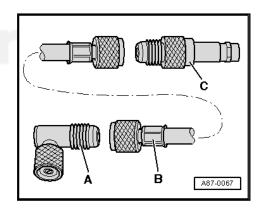
B - Charging Hose with Union Nut 5/8"-18 UNF (Short Version)

C - A/C Adapter Set - Adapter 2 - V.A.G 1786/2- .



Note

- For connections with large valve insert (standard on "Zexel / Valeo" compressors, gradual change to small valve insert from 10/1994), use the A/C Adapter Set - Adapter 10 V.A.G 1785/10 (remove valve from A/C Adapter Set - Adapter 10 or install valve opener in filler hose -B-).
- ♦ Beginning from production year 2006, the name of the "Zexel" A/C compressor was changed from "Zexel" to "Valeo".

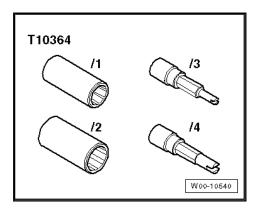


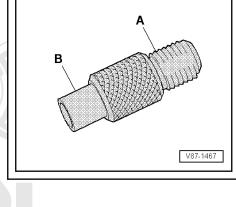
Refrigerant Sockets - T10364-



Note

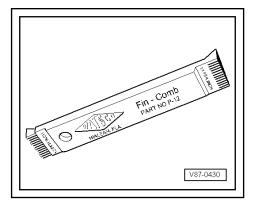
For removing and installing service connections and valve units when the refrigerant circuit is empty.





11.3 Commercially Available Tools and Ma-

Slat Comb



Filling Hoses

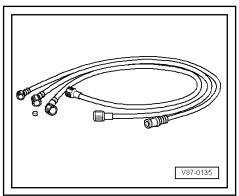
5/8"-18 UNF thread

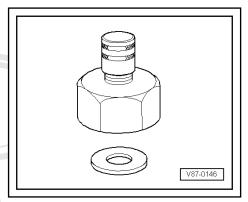


Note

- Use differently colored charging hoses (1800 mm long).
- Have valve opener and spare seals to hand.
- A short version of the filler hose is also included in the Refrigerant Circuits Adapter Set 1 VAS 6338/1-.

Connection piece for refrigerant cylinder with seal, quick-release coupling connection or threaded connection 5/8" - 18 UNF





Valve caps with replacement seals (for 5/8"-18 UNF thread)

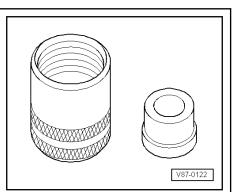
Seals can also be used for charging hoses.



Note

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Valve caps with spare seals are also included in Refrigerant Circuits Adapter Set 1 - VAS 6338/1-.



Αυδι

Pressure gauge battery with pressure reducer for nitrogen (maximum reducing pressure: 15 bar (217.56 psi))

- 1 -Pressure Gauge Battery
- 2 -Pressure Hose (inner diameter 5 mm, length 2 m (6.6 feet))
- 3 -Nitrogen
- Hose Fitting



Note

For connection to A/C Adapter Set V.A.G 1785 with 5/8"-18 UNF thread

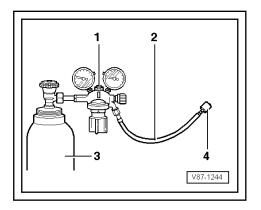
Quick-release coupling adapter for service connections.

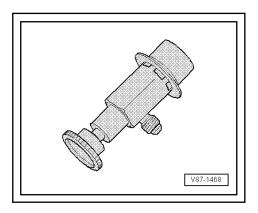
- High-pressure side, nominal size 16 mm
- Low-pressure side, nominal size 13 mm
- Release tool (Sharan), quantity: 2



Note

This quick-release coupling is delivered with the A/C service station.







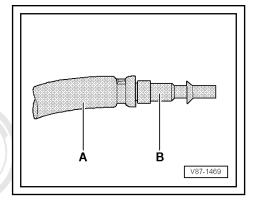
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Improvised Tools 11.4

Charging hose with connection for workshop compressed-air system

- A Charging hose 5/8" 18 UNF** (version with large inner diameter)
- B Connection for workshop compressed-air system ** (always use filter)



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Cautions & Warnings

Please read these WARNINGS and CAUTIONS before proceeding with maintenance and repair work. You must answer that you have read and you understand these WARNINGS and CAUTIONS before you will be allowed to view this information.

- If you lack the skills, tools and equipment, or a suitable workshop for any procedure described
 in this manual, we suggest you leave such repairs to an authorized Audi retailer or other
 qualified shop. We especially urge you to consult an authorized Audi retailer before beginning
 repairs on any vehicle that may still be covered wholly or in part by any of the extensive
 warranties issued by Audi.
- Disconnect the battery negative terminal (ground strap) whenever you work on the fuel system
 or the electrical system. Do not smoke or work near heaters or other fire hazards. Keep an
 approved fire extinguisher handy.
- Audi is constantly improving its vehicles and sometimes these changes, both in parts and specifications, are made applicable to earlier models. Therefore, part numbers listed in this manual are for reference only. Always check with your authorized Audi retailer parts department for the latest information.
- Any time the battery has been disconnected on an automatic transmission vehicle, it will be necessary to reestablish Transmission Control Module (TCM) basic settings using the Audi Factory Approved Scan Tool (ST).
- Never work under a lifted vehicle unless it is solidly supported on stands designed for the
 purpose. Do not support a vehicle on cinder blocks, hollow tiles or other props that may
 crumble under continuous load. Never work under a vehicle that is supported solely by a jack.
 Never work under the vehicle while the engine is running.
- For vehicles equipped with an anti-theft radio, be sure of the correct radio activation code before disconnecting the battery or removing the radio. If the wrong code is entered when the power is restored, the radio may lock up and become inoperable, even if the correct code is used in a later attempt.
- If you are going to work under a vehicle on the ground, make sure that the ground is level.
 Block the wheels to keep the vehicle from rolling. Disconnect the battery negative terminal (ground strap) to prevent others from starting the vehicle while you are under it.
- Do not attempt to work on your vehicle if you do not feel well. You increase the danger of
 injury to yourself and others if you are tired, upset or have taken medicine or any other
 substances that may impair you or keep you from being fully alert.
- Never run the engine unless the work area is well ventilated. Carbon monoxide (CO) kills.
- Always observe good workshop practices. Wear goggles when you operate machine tools or work with acid. Wear goggles, gloves and other protective clothing whenever the job requires working with harmful substances.
- Tie long hair behind your head. Do not wear a necktie, a scarf, loose clothing, or a necklace
 when you work near machine tools or running engines. If your hair, clothing, or jewelry were to
 get caught in the machinery, severe injury could result.

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Page 1 of 3

Cautions & Warnings

- Do not re-use any fasteners that are worn or deformed in normal use. Some fasteners are
 designed to be used only once and are unreliable and may fail if used a second time. This
 includes, but is not limited to, nuts, bolts, washers, circlips and cotter pins. Always follow the
 recommendations in this manual replace these fasteners with new parts where indicated,
 and any other time it is deemed necessary by inspection.
- Illuminate the work area adequately but safely. Use a portable safety light for working inside or under the vehicle. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.
- Friction materials such as brake pads and clutch discs may contain asbestos fibers. Do not create dust by grinding, sanding, or by cleaning with compressed air. Avoid breathing asbestos fibers and asbestos dust. Breathing asbestos can cause serious diseases such as asbestosis or cancer, and may result in death.
- Finger rings should be removed so that they cannot cause electrical shorts, get caught in running machinery, or be crushed by heavy parts.
- Before starting a job, make certain that you have all the necessary tools and parts on hand.
 Read all the instructions thoroughly, do not attempt shortcuts. Use tools that are appropriate to the work and use only replacement parts meeting Audi specifications. Makeshift tools, parts and procedures will not make good repairs.
- Catch draining fuel, oil or brake fluid in suitable containers. Do not use empty food or beverage containers that might mislead someone into drinking from them. Store flammable fluids away from fire hazards. Wipe up spills at once, but do not store the oily rags, which can ignite and burn spontaneously.
- Use pneumatic and electric tools only to loosen threaded parts and fasteners. Never use these
 tools to tighten fasteners, especially on light alloy parts. Always use a torque wrench to tighten
 fasteners to the tightening torque listed.
- Keep sparks, lighted matches, and open flame away from the top of the battery. If escaping hydrogen gas is ignited, it will ignite gas trapped in the cells and cause the battery to explode.
- Be mindful of the environment and ecology. Before you drain the crankcase, find out the
 proper way to dispose of the oil. Do not pour oil onto the ground, down a drain, or into a
 stream, pond, or lake. Consult local ordinances that govern the disposal of wastes.
- The air-conditioning (A/C) system is filled with a chemical refrigerant that is hazardous. The protected by copyright copying of private decommercial purposes, in part of in whole is not refrigerant that is hazardous. The performance system should be serviced only by trained automotive service technicians using approved refrigerant recovery/recycling equipment; trained in related safety precautions, and familiar with regulations governing the discharging and disposal of automotive chemical refrigerants.
- Before doing any electrical welding on vehicles equipped with anti-lock brakes (ABS), disconnect the battery negative terminal (ground strap) and the ABS control module connector.
- Do not expose any part of the A/C system to high temperatures such as open flame.
 Excessive heat will increase system pressure and may cause the system to burst.

Cautions & Warnings

- When boost-charging the battery, first remove the fuses for the Engine Control Module (ECM), the Transmission Control Module (TCM), the ABS control module, and the trip computer. In cases where one or more of these components is not separately fused, disconnect the control module connector(s).
- Some of the vehicles covered by this manual are equipped with a supplemental restraint system (SRS), that automatically deploys an airbag in the event of a frontal impact. The airbag is operated by an explosive device. Handled improperly or without adequate safeguards, it can be accidentally activated and cause serious personal injury. To guard against personal injury or airbag system failure, only trained Audi Service technicians should test, disassemble or service the airbag system.
- Do not quick-charge the battery (for boost starting) for longer than one minute, and do not
 exceed 16.5 volts at the battery with the boosting cables attached. Wait at least one minute
 before boosting the battery a second time.
- Never use a test light to conduct electrical tests of the airbag system. The system must only
 be tested by trained Audi Service technicians using the Audi Factory Approved Scan Tool (ST)
 or an approved equivalent. The airbag unit must never be electrically tested while it is not
 installed in the vehicle.
- Some aerosol tire inflators are highly flammable. Be extremely cautious when repairing a tire
 that may have been inflated using an aerosol tire inflator. Keep sparks, open flame or other
 sources of ignition away from the tire repair area. Inflate and deflate the tire at least four times
 before breaking the bead from the rim. Completely remove the tire from the rim before
 attempting any repair.
- When driving or riding in an airbag-equipped vehicle, never hold test equipment in your hands or lap while the vehicle is in motion. Objects between you and the airbag can increase the risk of injury in an accident.

I have read and I understand these Cautions and Warnings.

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